

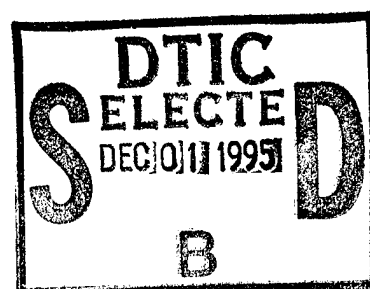
**Cultural Resources Survey
Lock Haven and Lockport, Clinton County
Pennsylvania**

Local Flood Protection Study

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**Department of the Army
Baltimore District, Corps of Engineers**

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CULTURAL RESOURCES SURVEY
LOCK HAVEN AND LOCKPORT, CLINTON COUNTY
PENNSYLVANIA

Local Flood Protection Study
Contract No. DACW31 - 82 - D - 0007
Job Order No. 0025

submitted to

Baltimore District, Corps of Engineers
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ABSTRACT

This report presents the results of cultural resource investigations conducted by Rogers Golden & Halpern and John Milner Associates, Inc. with regard to a proposed flood protection project on the West Branch of the Susquehanna River in the vicinity of Lock Haven, Pennsylvania. The project, proposed by the United States Army Corps of Engineers, is to include construction of a combination levee/floodwall around portions of the city of Lock Haven, and the demolition of 139 structures in Lockport on the north bank of the river. Previous cultural resource studies have identified several significant architectural resources: the Water Street Historic District in Lock Haven, and Lock No. 34 of the Pennsylvania Mainline Canal, Western Division, and its lockhouse, in Woodward Township. The present investigations consist of a review of existing data, a field survey of affected buildings to determine potential National Register eligibility, and site-specific research for properties deemed potentially eligible. Six additional properties or groups of properties were identified as potentially eligible: The Myers House, the McCormick House, and the Great Island Bridge Toll House, all in Castanea Township, and the John Hanna House, William Hanna House, and Lower Lockport Historic District in Woodward Township. As a result of these investigations each of the additional properties has been determined eligible for the National Register. Further, a recommendation is made that the project will have an adverse effect on all of the potentially eligible properties except the McCormick House and the Great Island Bridge Toll House. Possibilities for the mitigation of adverse effects are presented, as well.

Historic/archeological research was undertaken pertaining to the Bald Eagle Cross-Cut Canal Lock on Water Street in Lock Haven. An historical overview of the lock and its relation to the canal system is presented, and recommendations of potential eligibility and effect are made. Since construction of the floodwall will destroy the lock, recommendations for recordation of the lock are presented.

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1.0 INTRODUCTION

The United States Army Corps of Engineers has proposed a flood control project along the West Branch of the Susquehanna River in the vicinity of Lock Haven, Pennsylvania. The following cultural resources report was prepared in support of the Corps' environmental analysis for this project. After brief discussions of the purpose of these investigations and the history of the project, subsequent sections of the report outline the methods employed and the environmental and historical setting of the project area. Sections 5 and 6 present the results of these investigations, applying the criteria of eligibility for the National Register of Historic Places. Evaluations of significance are presented in Section 6 and are followed by discussions of potential effects and mitigative options. Section 7 contains a discussion of the Bald Eagle Cross-Cut Canal and its outlet lock in Lock Haven and makes recommendations for recordation of the outlet lock. References cited figures, tables, plates, and appendices complete the report.

1.1 Purpose and Goals of the Investigations

The investigations reported herein were undertaken to assist in compliance with the National Environmental Policy Act of 1969, the National Historic Preservation Act of 1966, and other applicable federal and state mandates. The primary objective was to identify historical resources within the project's area of potential impact which are

eligible for the National Register of Historic Places, in order that they may be properly considered during the flood protection project.

1.2 History of the Flood Protection Project:

The first flood protection project for Lock Haven was authorized in the Flood Control Act of 1936, but because of opposition from the local community, the project was not built and its authorization expired in 1951. In 1970, the Susquehanna River Basin Study Coordinating Committee recommended a flood protection project in the Lock Haven area. The United States Army Corps of Engineers undertook a survey in 1974, published as House Document No. 94-577, August 5, 1976, which recommended a wall-levee system of protection. This plan was authorized in the Water Resources Development Act of 1976 (P.L. 94-587). The project authorized in the act consisted of a 9,900 foot flood wall extending from Lock Haven University to the Constitution Bridge, and a levee which followed a segment of Bald Eagle Creek. In the 1974 survey, impact of the project on Lock Haven's cultural resources was considered and sites of significance were identified. These included the Water Street Historic District and the Heisey House, both listed in the National Register, the proposed Sloan Historic District and seven other properties deemed eligible for the Register: five in the Water Street District; another, the Rogers Gymnasium, at Lock Haven University, and the other, the McCormick Homestead, east of town near Great Island. The cultural resources of Lockport were not considered in the 1974 study

(Department of the Army 1975). As a result of this survey, a Memorandum of Agreement was executed between the Corps of Engineers and the Advisory Council on Historic Preservation which included a provision for mitigation of the adverse effects of the floodwall "visually isolating the National Register properties from the West Branch of the Susquehanna River". This mitigation consisted of the inclusion of six (6) openings in the flood wall along Water Street (Advisory Council on Historic Preservation 1975).

The Act also authorized a Phase I Advanced Engineering and Design Study to affirm the validity of the 1974 survey. The new study concluded that, wherever possible, a levee should be built instead of a flood wall. It also determined that the openings called for in the Memorandum were impractical and should be eliminated (United States Army Corps of Engineers 1980). As part of the 1979 study, a Phase I cultural resource reconnaissance was conducted which identified archeological and architectural/historical resources and pinpointed needs for Phase II research. This survey identified the John McCormick Homestead in Castanea Township and the John Hanna House in Lockport as requiring more study. The report also suggested further consideration of seventeen canal-era houses and the Lock-House and Canal Lock in Lockport (Hay, Deans, and Israel 1979).

The flood protection project (Figure 1) as presently proposed will surround Lock Haven to the north, east and south with a combination of

levee and floodwall. A levee will extend along the river bank from Lusk Run, near Lock Haven University, to Vesper Street; then, a concrete floodwall will continue from Vesper to Race Street, and with the exception of a small segment of wall at the Hammermill plant on Bald Eagle Creek, will revert to levee for the remainder of the project. The project also includes the acquisition and removal of 139 structures on the Lockport side of the Susquehanna to mitigate the adverse effects of raised flood levels due to construction of the levee and wall (United States Army Corps of Engineers 1980).

The present study was undertaken in 1984 to provide Phase II investigations of the previously identified architectural resources, and to consider certain resources not addressed in the previous studies. Among these resources is the lock of the Bald Eagle Cross-Cut Canal located directly beneath Water Street, east of the Jay Street Bridge. The lock would be destroyed by construction of the flood wall; consequently, in-depth research has been conducted to determine its significance and to assess needs for mitigation (see Section 7.0). Also, an intensive survey of buildings to the east of Lock Haven's historic district and in Lockport was conducted in order that all potentially significant structures might be considered in the determination of adverse effects and their mitigation.

1.3 Description of the Study Area

The Flood Protection Project area includes most of Lock Haven's riverfront and all of Lockport. A previous architectural survey (Clinton County Planning Commission 1984) of the Water Street Historic District conducted by Susan Hannegan of the Clinton County Planning Commission successfully identified significant structures within this district which, on its northern border along the river bank, extends from Sixth Street to Henderson Street. A complete inventory of the resources identified in this study appears in Table 1. In consultation with Steven Israel of the Corps of Engineers, Greg Ramsey of the Bureau of Historic Preservation, and Ms. Hannegan, it was mutually agreed that present investigations should address properties facing Water Street between the existing eastern edge of the district and the Castanea Township line, and in Castanea, from the Township Line to the head of Great Island (Figure 2). Accordingly, properties located west of the district, including the Winner House and Office (Water and Main Streets), were not addressed. Thirty structures were chosen to be surveyed; eleven of these were identified previously as probable acquisitions by the project (United States Army Corps of Engineers 1980), while the remaining 19 were selected as most representative of the architectural styles and building types of this part of Lock Haven.

North of the river, the project will acquire and remove 139 structures in Lockport. The exact locations of these structures were identified

with the assistance of Robert Yowell, Director of Lock Haven's Flood Protection Planning Board. Each is included in a discontinuous portion of the study area, extending from Reeds Run near the intersection of Routes 664 and 661 westward to Route 572 (Figure 2). The affected structures occupy the floodplain close to the river.

2.0 METHODS AND PROCEDURES

The architectural investigations consisted of three stages. First, a review of existing data was undertaken in order to develop a historical overview of the area and to ascertain which properties had already been determined significant. Next, a field examination of all potentially affected properties was conducted to identify other potentially significant structures. When the field examination was completed, structures which appeared to meet at least one of the criteria for National Register eligibility were more intensively researched.

2.1 Existing Data Review

The first task of the investigation of architectural resources was a literature search directed toward establishing the historical context of the project area. Repositories visited included the Ross Library, the Clinton County Historical Society, the Lock Haven University Archives, and the Express photo collection, all in Lock Haven. A variety of published sources were examined, including local and specialized histories, articles in newspapers and magazines, and historic maps and atlases. Notes were made from each of these sources, and information from them was incorporated into the historical overview (Section 4.0) and the documentation of potentially eligible properties (Section 5.2). A second task was to locate and compile basic data for previously identified architectural resources within the study area. To this end,

the records of the Bureau for Historic Preservation in Harrisburg were consulted, as well as those of the Clinton County Planning Commission, including the Clinton County Historic Sites Survey. Also, cultural resource reports generated during previous projects were studied. These include:

Department of the Army, Corps of Engineers, 1975 Final Environmental Statement, Lock Haven Flood Protection Project, Washington, D.C. (published as House Document 94-577, 1976)

Hay, Conran A., Thomas R. Deans, and Stephen S. Israel, 1979, Lock Haven Flood Protection Project: Cultural Resources Reconnaissance, Camp Hill, PA.

In addition to the repositories listed above, the State Archives in Harrisburg, the Centre County Historical Society, the Historical Society of Pennsylvania, and the Pennsylvania Canal Museum in Easton were consulted during historic and archeological research of the lock of the Bald Eagle Cross-Cut Canal.

2.2 Field Examination

Upon completion of the existing data review a pedestrian field examination was undertaken in order to confirm previous assessments of significance and to identify sites of potential significance not previously noted. Every affected property was visited by the field team (each property is inventoried and mapped in Table 2). As requested by the Bureau for Historic Preservation, each property was also recorded on

a Pennsylvania Historic Resource Survey Form (Section 9.8). This form permits recordation of specific information concerning a building's structure, design and history, providing an opportunity to include these endangered buildings in the Clinton County Historic Sites Survey. Among the data placed on the form was a notation of the building's condition and integrity, and a recommendation of eligibility for the National Register of Historic Places. Each structure was also photographed in accordance with state survey procedure.

2.3 Site-Specific Research

At the conclusion of the field examination, site-specific research was conducted for those properties deemed potentially eligible for inclusion in the National Register. In addition to the repositories consulted in Section 2.1, the Clinton County Court House deed records were examined and a title search undertaken for all potentially eligible properties. Briefs of title were recorded on the survey forms for these properties.

3.0 LOCATIONAL SETTING

The communities of Lock Haven and Lockport are located on the south and north banks respectively of the West Branch of the Susquehanna River in Clinton County, Pennsylvania. The river valley lies at the interface of two physiographic provinces, the Appalachian Ridge and Valley and the Appalachian Plateau.

A number of roads pass through the study area. Three major highways, Routes 120 and 220, and the Keystone Shortway (Interstate 80) serve the Lock Haven area. Both 120 and 220 pass through Lock Haven, with 120 taking a northwesterly course along the south bank of the river toward Renovo, and 220 crossing the river by the Constitution Bridge, extending northeasterly toward Williamsport. A recently constructed spur, the Route 220 By-Pass, skirts Lock Haven to the south and rejoins 220 to the east at Avis. On the Lock Haven side of the river, the major east-west thoroughfare affected by the project is Water Street, a tree-lined residential area whose eastern portion closely parallels the river bank. At the Castanea Township line, Lock Haven's eastern limit, Water Street becomes the Island Route, crossing the Great Island on its way east. This was the original road to Williamsport in the eighteenth century. Jay Street, in the center of town and perpendicular to the river, crosses at the Jay Street Bridge. On the Lockport side, Route 664 begins to the east of the bridge, and Route 18011 begins to the west,

forming the main east-west artery on the north bank of the river. A number of small township roads branch off from the main highway.

4.0 HISTORICAL OVERVIEW

Long before European settlement, the Lock Haven area was occupied by Indian populations. The region of central Pennsylvania is known to have supported Paleo-Indian populations (c.10,000 B.C.-c.8,000 B.C.), and archeological evidence exists in Lock Haven of Archaic (8,000 B.C. - 2,000 B.C.), and Woodland (1,000 B.C. - historic contact) period settlements (Hay, Deans, and Israel 1979:I:7). In the period of European-Indian contact, Delaware, Shawnee, Iroquois and other Indian groups were encountered, particularly on Great Island (also called Big Island), Dunnstown, and the area above Lockport known as Monseytown Flats, so-named for a village of Monsey Indians traditionally believed to have been sited there (Ream 1922:1).

European settlement did not begin until the second half of the eighteenth century, though the area was visited before then. Several accounts exist in the journals of missionaries which give vivid images of the Indians in the years of their displacement. In July of 1748, John Martin Mack, a Moravian missionary, and his companion visited Great Island during a famine, and provided the following account:

July 11. Towards evening reached Great Island, and found Indians at home, residing on this side of the island. They asked us from whence we came, and whether we had ought to sell. When told that we were not traders, but had only come to visit them, it was incomprehensible to them. But a few

old squaws were living on the island; the men had been driven away by the famine. We consequently remained on this side of the island, and asked an Indian whether we could lodge in his hut. He took us in cordially, and spread a bear skin for us to sleep on; but he had nothing for us to eat. Ascertained that he was a Five Nation Indian, and his wife a Shawanese; whereupon Brother Zeisberger conversed with him.

His father, who is upwards of 70 years, was dying of smallpox, and was a most pitiful object. His case, and that of the Indians here, enlisted our sympathies and silent prayers.

In the evening we were visited by a number of Indians --Shawanese and Cayugas. Here dwell in three houses Shawanese, Maquas and Delawares; among the latter an Indian from Albany, who spoke Low Dutch. In all three houses were cases of smallpox. In one hut hung a kettle in which grass was being stewed, and which they ate with avidity. (Ream 1922:3)

The land belonged to the Indians until 1768, when the Treaty of Fort Stanwix opened the land south of the Susquehanna to white settlement. Anyone who had settled previous to this time was considered a squatter, and one such, a man named Cleary Campbell, was forced to vacate land on what is now Lock Haven University because it had been granted to someone else (Furey 1892:105).

As soon as the legal difficulties had been removed by the treaty, land speculators began the acquisition of property, and surveyors were

dispatched to lay out the various tracts. Most of the Lock Haven vicinity was included in a grant of 1680 acres to Dr. Francis Allison. With the surveyors was a hunter named William Dunn who managed to bargain possession of Great Island from the Indians, exchanging, as legend has it, a rifle, equipment, and a keg of whiskey for the land. He remained on the island and became one of the founding settlers of the area (Linn 1883:607).

Allison never occupied his grant, and sold it to John Fleming in 1773, who settled on the eastern end of the property near the Great Island. At his death in 1777, the tract was divided among his heirs, and his son-in-law, John McCormick, created a farmstead from his wife's inheritance and another segment sold to him by Fleming's son, Joseph (Furey 1892:95).

Others, such as John Myers, who ran a tavern near the Great Island, and William Reed, whose stockaded cabin at the western edge of settlement served as "Fort Reed", had come into the area soon after the land was opened up. But despite the influx of new settlers, life still had much of a frontier aspect as the threat from Indian raids was very real. The Revolutionary War saw an increase in Indian hostility, and this culminated in the "Great Runaway" in 1778. News of killings in surrounding areas had heightened fears in the village, and word of the Wyoming massacres in July precipitated a complete evacuation of the settlement. Women and children traveled in boats down the center of the

river, while the men walked single file on both banks to protect them. The refugees made Sunbury without incident, and did not return for good until after the Revolution was over.

By the end of the war, the Indian threat had diminished and the area attracted new settlers along with the returning "runaways". The land north of the Susquehanna was opened to settlement in 1785, and the north bank was quickly bought up by such people as William Dunn of Great Island, Cookson Long, who commanded Fort Reed, and David Hanna. The land on both sides of the river was attractive for the fertile soil of the floodplain and for the abundance of timber, and by the turn of the nineteenth century, a substantial community of neighboring farms had grown up. The land that had originally been the Allison tract was known colloquially as "Old Town", though it did not possess any actual corporate identity (Furey 1892:105).

Growth in the nineteenth century was steady as the seemingly endless supply of timber attracted many to the logging industry. The real impetus for expansion came in the early 1830's with the construction of the Pennsylvania Mainline Canal and the Bald Eagle Cross-Cut Canal. Before the canals were built, transport on the river was often difficult due to low water levels, particularly for the large rafts of bound-together logs, the usual means of transporting timber down river. The canals lessened this problem by providing dependable routes of access to the centers of commerce. A dam was built above the Great Island to

provide water for the canal on its northwesterly course to Farrandsville, and this created a sort of pool or harbor convenient for the gathering of rafts. The area was ideally suited to become the point of transition where the raw timber was converted to lumber and then sent on its way into the canal system (see Section 7.0).

Investors were quick to realize this potential, and among the quickest and most foresighted was Jerry Church, a colorful character who, in October of 1833, purchased 200 acres around the Bald Eagle Cross-Cut, divided them into lots, and held an auction on November 4th at which many were sold (Plate 1). Church chose the name Lock Haven in recognition of the canal locks on both sides of the river and the raft harbor or "haven" created by the dam.

Others were also busy taking advantage of the area's potential. On the north bank of the river, two communities were created at about the same time. Dunnsburg, on property first owned by William Dunn just north of Great Island, was laid out by H. Lenhart in 1832 (Lycoming County 1832:179). Directly across from Lock Haven, Nathaniel Hanna subdivided the riverfront of his family farm into the community of Lockport (Linn 1883:669). A ferry was operated between Lock Haven and Lockport approximately where the Jay Street Bridge now crosses.

A map of the canal from about 1835 (Figure 10) shows that the area had yet to take on the aspect of a real town. Lock Haven grew steadily,

though it appears that the northern communities of Lockport and Dunnsburg developed less rapidly. By 1839, the population had increased to the point where the creation of a new county was feasible, and after much political wrangling with the mother counties, Lycoming to the east and Centre to the west, Clinton County was established. The new county was named for DeWitt Clinton, the New York governor who built the successful Erie Canal. Lock Haven was made county seat, and a court house was built in 1844.

The construction of the West Branch Boom in 1849 was the major event which established Lock Haven as a center of the lumber industry. The boom was essentially a large chain of logs stretched between piers across much of the river directly above Lock Haven. This chain captured free-floating logs from upriver, rendering the construction of rafts unnecessary and allowing for truly large-scale logging operations. The logs were branded at their place of origin and then sorted after they reached the boom.

The success of the boom led, in turn, to a great expansion in the economy of Lock Haven and the surrounding communities. Industries such as sawmills and furniture factories sprang up, as well as support services such as hotels and stores. This new prosperity was soon reflected in the architecture of the town, most notably in the work of Philadelphia architect Samuel Sloan, who designed several mansions, the Fallon Hotel, and a new court house, all of which stand today. In 1859,

the Philadelphia and Erie Railroad extended its line to Lock Haven from Sunbury, adding another link to the commerce centers of the east. By 1860 the population had risen to 3,349 people, up from only 830 in 1850 (Clinton County Planning Commission 1984:Chart I). An 1862 map of Lock Haven shows how far the town had come in the 30 years since its creation (Plate 2).

Lockport shared as well in the logging bonanza. Two large hotels, the Woodward House, built in 1847, and the Hanna Hotel, built in 1860, provided lodging for loggers and canalmen, entertaining upwards of 25,000 men in a season (Linn 1883:670). Nathaniel Hanna sold many of the lots he had laid out 20 years before, and invested in the construction of a covered wood bridge to Lock Haven in 1852.

In 1856, William White bought the southeastern corner of John Hanna's farm and divided it into 39 lots, many of which had buildings by 1862 (Plate 3). Other businesses included a brewery and a blacksmith, and below Lockport in Dunnsburg were a tannery, a sawmill and a brick kiln (Walling 1862).

The area's prosperity was not to last. Mass logging operations eventually depleted the timber supply, and railroads rendered the canal system obsolete. When a flood severely damaged the canal in 1889, it was abandoned to navigation (Pennsylvania Canal Company Report 1889:3-

4), signalling the end of the logging industry as a potent force in Lock Haven's economy.

As Lock Haven adjusted to its reduced circumstances, other industries were established in the late nineteenth century. Principal among these was paper-making, which, though allied to the lumber industry, flourished as its predecessor failed and died out. The present-day Hammermill plant is a direct descendent of the first of these early companies, founded in 1881. Also begun in the 1880's and 90's were a brickyard and a silk mill (Clinton County Planning Commission 1984).

The major industrial development of the twentieth century was the arrival of Piper Aircraft Corporation in 1937. By 1940, Piper had become the largest producer of small planes in the country, and within recent memory employed more than 1,000 people, producing 29 different models of aircraft. Business reverses in the late 1970's caused a series of layoffs at the plant, culminating in its permanent closure in May of 1984.

One constant in the history of Lock Haven has been the threat of flooding. A series of floods in the nineteenth century played havoc with the dam and canals, made particularly dangerous by free-floating logs. In the twentieth century, two devastating floods have occurred, one in 1936 whose levels have not yet been surpassed, and one in 1972, brought on by Tropical Storm Agnes, which caused \$45 million in damage.

There were 11 other floods in the twentieth century (prior to 1972) which rose above 21 feet at the Jay Street Bridge hydrograph and caused significant problems (Department of the Army 1975).

5.0 RESULTS OF THE ARCHITECTURAL INVESTIGATIONS

5.1 Previously Identified Architectural Resources

For the purposes of this investigation, previously identified architectural resources are defined as those buildings or districts which previously had been placed in the National Register of Historic Places, or previously had been officially determined eligible for such placement. These resources are listed below by township; corresponding survey codes appear in parentheses following the resource name. Survey codes for components of the Water Street Historic District are listed in Table 1. Resource locations are shown in Figure 4.

5.1.1 City of Lock Haven

- **Water Street Historic District** (035-LH-001 to 035-LH-412) The district is bounded on the north by the West Branch of the Susquehanna River, on the east by the lot number 8 on the original plan of Lock Haven (1833), then continuing in a westerly direction along Jordan Alley to Henderson Street, then south on Henderson Street to Willard's Alley, then west on Willard's Alley to Bellefonte Avenue, then along Bellefonte Avenue in a southwesterly direction to Mary's Alley, then west on Mary's Alley to the railroad right-of-way and along that right-of-way to Sixth Street, then in a northerly direction along Sixth Street to the bank of the Susquehanna River.

The district contains a number of well-preserved examples of nineteenth and twentieth century architecture, including the Heisey House, 362 East Water Street, a mid-nineteenth century gothic cottage which is itself listed in the National Register. The buildings in the district have been well-documented in the Clinton County Historic Sites Survey conducted in 1984 by Susan Hannegan of the County Planning Commission. Contributing components of this district are classified as "S" (significant) and "C" (contributing) in Table 1 (right side). The Water Street Historic District was placed in the National Register on July 10, 1973.

5.1.2 Castanea Township

No architectural resources were previously identified in Castanea Township.

5.1.3 Woodward Township

- **Lock No. 34 and Lock House (035-WW-001)** This property is located approximately 1/4 mile east of the Jay Street Bridge on Route 664. The lock and its attendant lock house were built circa 1834 as part of the West Branch Division of the Pennsylvania Canal. They were determined eligible in December 1984 (Section 9.7).

5.2 Architectural Resources Identified As a Result of Present Investigations

The following resources have been identified in the course of present investigations as potentially eligible for the National Register (Figure 5). Each potentially eligible property is represented by name, survey code, and brief description and statement of significance. Resources are documented more fully in the appropriate Pennsylvania Historic Resource Survey Form. Forms are ordered chronologically by survey code in Section 9.8. Subsequent to present investigations each of these resources was determined eligible for the National Register on September 5, 1985 (See Bureau for Historic Preservation letter, Section 9.7).

5.2.1 City of Lock Haven

In the portion of Lock Haven included in the alignment and study area, it does not appear that there are any potentially eligible properties.

5.2.2 Castanea Township

- **Myers House** (035-CT-009) This house is located approximated 1,000 feet from the Great Island Bridge. It is an important example of a style that was very popular in Lock Haven in the middle of the nineteenth century, and of which few examples exist today. Characteristic elements include the stepped parapet gables with stone

inserts at the cornice line, and the classical window and door treatments in the Greek Revival style. The house was probably built c.1850 by John Myers, Jr., whose father operated a tavern for many years on the property.

- **McCormick House** (035-CT-011) This house is located at the head of the Great Island on the north side of the Island Route approximately 100 feet to the east of the Great Island Bridge. It is a well-preserved example of the Italian Villa style. Distinctive elements include a superb carved hood molding over the entrance, paired brackets with frieze windows in the cornice, and flush vertical wood siding, which may be original. The house was probably built c.1866 by Robert McCormick.

- **Great Island Bridge Tollhouse** (035-CT-012) The tollhouse is situated across from the McCormick House at the head of Great Island, south of the Island Route and approximately 100 feet east of the bridge. This vernacular brick and frame structure is of interest primarily for its role in the history of Lock Haven transportation. The earlier bridge, like the original Jay Street Bridge, was privately owned and maintained, and tolls for its use were collected at this building. It was probably built circa 1864 as a business concern of the McCormick family.

5.2.3 Woodward Township

- **Lower Lockport Historic District** (035-WW-001, 035-WW-006 through 035-WW-025) This historic district includes the eligible lock and lock keeper's house, as well as the range of structures facing Route 664 and extending westward for c.1200 feet (Figure 3E). These properties comprise an important surviving concentration of canal era houses which developed around Lock 34. For the most part these structures share a common facade line and some general formal characteristics, such as a two story height, three or four bay main facade, gabled roof paralleling the street, and single story porch, some of which are elaborately detailed. Although several houses are built of brick, most have a wood framed construction. With the exception of Lock No. 34 and Lock House, none appears to be eligible individually due to a lack of both architectural distinction and singular historical associations. A list of components follows.

Lock No. 34 and Lock House (035-WW-001)

Shoemaker House (035-WW-006) c.1890

Karchner House (035-WW-008) c.1873

Simcox House (035-WW-009) c.1873

Chilcot House (035-WW-010) c.1885

Englert House (035-WW-011) c.1880

Village Tavern (035-WW-012) c.1880

Kreamer House (035-WW-013) c.1880

Wolfe House (035-WW-014) c.1920
 Colucci House (035-WW-015) c.1890
 Long House (035-WW-016) c.1900
 Englert Mobile House (035-WW-017) 1973 (intrusive)
 Peters House (035-WW-018) c.1950 alterations
 Wasson House (035-WW-019) c.1890
 Rachel House (035-WW-020) c.1895
 Laubach House (035-WW-021) 1910
 Poremsky House (035-WW-022) c.1890
 Donovan House (035-WW-023) c.1880
 Pokorny House (035-WW-024) 1910
 Pokorny House (035-WW-025) c.1900

- John Hanna House (035-WW-072) The John Hanna House is located on Township Road 359, approximately 1700 feet west of its intersection with Water Street. It is important for its association with John Hanna, one of the early settlers in Lockport, and as an intact example of an early nineteenth century stone farmhouse, a type that is rare in the Lock Haven vicinity. John Hanna bought the tract in 1801 and by 1813 had built at least a portion of the present house. A date stone near the roof peak of the main part of the house bears that date, but the owner believes that the main portion may actually date from the 1830's (Haussener, personal communication 1985), having been added to the stone and frame house which now forms the rear wing.

- **William Hanna House (035-WW-073)** The William Hanna House is located on Township Road 359, approximately 2500 feet west of its intersection with Water Street. William Hanna was a grandson of John Hanna and is likely to have built the house c.1880. The house is significant for its use of wooden rustication, an extremely popular decorative device in Lock Haven during the late nineteenth century.

In a previous study, the John McCormick Homestead (not to be confused with the McCormick House) in Castanea Township was noted as worthy of further study to determine potential eligibility (Hay, Deans, and Israel 1979). The McCormick Homestead is a large nineteenth century farmhouse which has been heavily renovated in recent years, seriously compromising its integrity. A survey of the building in 1973 noted several important features which have since been removed or obscured (see Section 9.7). A Greek fret molding on the entrance facade has either been removed or covered by the recent addition of aluminum siding, and the cornice returns on the roof have been removed. All of the six-over-six pane windows have been replaced by modern two-over-two windows. A late nineteenth century porch, a twentieth century chimney, and a new asphalt shingle roof are further intrusive elements. The outbuildings are all modern farm structures. Historically, the farm is identified with John McCormick, one of the early settlers in the area. He lived to be 96 and died in 1831, so it is possible that he lived for a time in this house. But considering the distinguishing stylistic features, the Greek fret frieze and the Greek doorway with pilasters,

sidelights and transom, it seems equally possible that the house was built after John McCormick's death by his son Robert. The building's lack of integrity seems to render it ineligible for the National Register.

6.0 SUMMARY AND RECOMMENDATIONS FOR ARCHITECTURAL RESOURCES

Based on the results of these investigations, conclusions have been drawn about the potential significance of properties and projections have been made about potential effects the project may have on architectural resources. Should the undertaking be determined to have an adverse effect on any resource, mitigation of the adverse effects may be an appropriate alternative. Each of these issues is presented in the sections which follow.

6.1 Evaluation of Potential Significance

Determination of the significance of a property is based upon the Evaluation Criteria of the National Register for Historic Places. These state:

The quality of significance in American History, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship feeling and association, and:

1. that are associated with events that have made a significant contribution to the broad patterns of our history; or
2. that are associated with the lives of persons significant in our past; or
3. that embody the distinctive characteristics of a type, period, or

method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

4. that have yielded, or may be likely to yield information important in prehistory or history.

The architectural resources identified in this investigation appear to meet at least one of these criteria (36 CFR 63).

- Myers House, Castanea Township (035-CT-009)

This property appears to meet Criterion 3 of the National Register.

- McCormick House, Castanea Township (035-CT-011)

This property appears to meet Criterion 3 of the National Register.

- Great Island Bridge Toll House, Castanea Township (035-CT-012)

This property appears to meet Criterion 3 of the National Register.

- Lower Lockport Historic District, Woodward Township (035-WW-01, 035-WW-006 through 035-WW-025)

This district appears to meet Criterion 1 of the National Register.

- John Hanna House, Woodward Township (035-WW-072)

This property appears to meet Criteria 2 and 3 of the National Register.

- William Hanna House, Woodward Township (035-WW-073)

This property appears to meet Criterion 3 of the National Register.

6.2 Potential Effects

The effects a proposed undertaking will have upon a cultural resource are predicted based upon the distinguishing elements of the resource and the design and consequence of the undertaking. Effects to cultural resources are evaluated with regard to Criteria of Effect and Criteria of Adverse Effect established by the Advisory Council on Historic Preservation. An undertaking is considered to have an effect if it "causes or may cause any change. . . in the quality of the . . . characteristics that qualify the property to meet the criteria of the National Register" (36 CFR 800). Since effects are based upon characteristics which contribute to the significance and National Register eligibility of a property, effects occur only to properties which are eligible for the Register.

Effects may include positive or negative changes and may be direct or indirect. Direct effects are often construction-related and occur at the same time and place as the undertaking. Indirect effects are normally more long term or further removed in distance and may result from changes in land use or other exchanges ancillary to the project.

Adverse effects occur when the project results in detrimental changes, either direct or indirect, to a Register-eligible property's significant historical, architectural, archeological, or cultural characteristics. The Advisory Council's Criteria of Adverse Effect are as follows:

Adverse effects on National Register or eligible properties may occur under conditions which include but are not limited to:

- A) destruction or alteration of all or part of a property;
- B) isolation from or alteration of the property's surrounding environment;
- C) introduction of visual, audible, or atmospheric elements that are out of character with the property, or alter its setting;
- D) neglect of a property resulting in its deterioration or destruction;
- E) transfer or sale of a property without adequate conditions or restrictions regarding preservation, maintenance, or use (36 CFR 800)

Following is an evaluation of the potential effects of the flood protection project on architectural resources identified in this and previous investigations (Figures 4, 5, and 6). This evaluation of potential effects is based on the Selected Plan of July 1980. Consequently, the recommendations which follow address conditions presented only in this plan.

- Water Street Historic District

As proposed in the Selected Plan of July 1980 a levee will be built along the northernmost edge of the Water Street Historic District from Sixth Street on the west to Vesper Street on the east. A floodwall will be built along the northernmost edge of the district,

adjoining the levee at Vesper Street on the west and extending eastward beyond Henderson Street, the eastern boundary of the district. Plans (United States Army Corps of Engineers 1980) call for the probable acquisition of fourteen structures located within this district. Of these structures, four have been designated as contributing components of the Water Street District. These components are 215-217 East Water Street (039-LH-002A); Rear 201 East Water Street (039-LH-004A); 116-118 Mill Street (039-LH-027); and 115 Mill Street (039-LH-031).

The introduction of both the levee and floodwall will have a positive effect on the district as a whole by protecting the vast majority of its components from future flooding, thus lessening their physical deterioration and rendering preservation and stabilization options more attractive to property owners. However, they also will have a negative effect on the district. Both the levee and floodwall will result in the destruction or alteration of the entire northernmost edge of the district (Criterion A) and may result in the destruction of one or more of its contributing components which the Corps of Engineers may acquire. For example, the Selected Plan shows that the rear portion of 215-217 East Water Street is located within the alignment of the proposed floodwall. The undertaking also will result in isolation from or alteration of the district's surrounding environment (Criterion B). The river and its proximity to the district are intrinsic to the architectural and historical

significance of the district. Although the adverse effect on existing levels of integrity of location and setting will be greatest in the vicinity of the riverfront the entire district will be affected adversely. Finally, the undertaking will result in the introduction of visual elements that are out of character with the district (Criterion C). While a levee may be preferable to a floodwall due to its natural materials and forms, either structure will intrude visually on the integrity of form, setting, and feeling presently attributable to the district.

The remains of the Bald Eagle Cross-Cut Canal Lock also are located within the district. Since the lock is located between the proposed floodwall and the river this resource also may be affected adversely, resulting in its neglect or deterioration due to flood damage (Section 7.3).

- Myers House

As proposed in the Selected Plan of July 1980 a levee will be built c.50 feet north of the house. The Corps of Engineers also may acquire the house (United States Army Corps of Engineers 1980). The levee will have a positive effect on this property by protecting it from future flooding, thus lessening its physical deterioration and rendering preservation and stabilization options more attractive to its owners. However, should the house be removed due to levee construction the undertaking would have an obvious adverse effect

(Criterion A). Similarly, should the house remain standing the levee may cause other adverse effects due to isolation of the property from its surrounding environment (Criterion B) and the introduction of visual elements that are out of character with it (Criterion C).

- McCormick House

It appears that the undertaking will have no effect on this property (United States Army Corps of Engineers 1980:55).

- Great Island Bridge Toll House

It appears that the undertaking will have no effect on this property (United States Army Corps of Engineers 1980:55).

- Lower Lockport Historic District (including Lock No. 34 and Lock House)

As proposed in the Selected Plan of July 1980 each of the district components will be removed (United States Army Corps of Engineers 1980). Thus, the undertaking will have an obvious adverse effect (Criterion A). However, should the structures be allowed to remain, there also may be an adverse effect due to neglect, resulting in deterioration or flood damage (Criterion D).

- John Hanna House

As proposed in the Selected Plan of July 1980 this structure will be removed (United States Army Corps of Engineers 1980). Thus, the

undertaking will have an obvious adverse effect (Criterion A). However, should the structure be allowed to remain, there also may be an adverse effect due to neglect, resulting in deterioration or flood damage (Criterion D).

- William Hanna House

As proposed in the Selected Plan of July 1980 this structure will be removed (United States Army Corps of Engineers 1980). Thus, the undertaking will have an obvious adverse effect (Criterion A). However, should the structure be allowed to remain, there also may be an adverse effect due to neglect, resulting in deterioration or flood damage (Criterion D).

6.3 Potential Mitigative Options

Under the requirements of Section 106 of the National Historic Preservation Act, when it is determined that a federal project will have an adverse effect on a Register-eligible property, the agency involved must consult with the Advisory Council on Historic Preservation and the State Historic Preservation Officer to devise a plan to mitigate or avoid the adverse effects of the project on the historic properties. In most cases, this consultation results in a Memorandum of Agreement, which sets forth what will be done to treat the adverse effect, and which is legally binding. This section presents options for the

mitigation of adverse effects of the flood protection project. In general, these options include avoidance, recordation, and relocation.

- Water Street Historic District

Destruction or alteration of the entire northernmost edge of the district resulting from construction of the levee and floodwall (Criterion A) may be mitigated through relocation of both the levee and floodwall onto fill in the river. Thus, all direct involvement with the district could be minimized or avoided. However, if the present alignment is retained, direct effects on contributing components of the district (e.g., 115 Mill Street; 116-118 Mill Street; Mackey Carriage House, Rear 201 East Water Street; and Grafius House, 215-217 East Water Street) could be mitigated by relocation of these structures to appropriate nearby sites. Should relocation be determined impractical, rendering demolition unavoidable, these structures should be recorded to standards established by the Historic American Buildings Survey. Isolation from or alteration of the district's surrounding environment due to the introduction of a levee and floodwall (Criterion B), regardless of its exact alignment, is one adverse effect which cannot be mitigated. However, the introduction of visual elements that are out of character with the district (Criterion C) may be mitigated by sensitive design of the levee and floodwall. Every attempt should be made to minimize the visual presence of these structures. Accordingly, any architectural treatment which would attract

attention to this district intrusion, and thus detract from existing architectural qualities, is inappropriate. All exposed surfaces should be free from ornamentation and painted in a suitable earth tone. Street furniture, lighting fixtures and landscaping all should be as visually unobtrusive as possible.

Mitigative options for the Bald Eagle Cross-Cut Canal Lock are presented in Section 7.4.

- Myers House

The potential removal (Criterion A) of the Myers House appears to be a result of proposed road relocation due to construction of the levee (Yowell, personal communication 1984). To mitigate this adverse effect, it is recommended that the road and levee be redirected to avoid the Myers House. There is no way to mitigate the isolating effect (Criterion B) the levee will have on the property. However, the introduction of visual elements that are out of character with the property (Criterion C) may be mitigated by sensitive design of the levee. Every attempt should be made to minimize the visual presence of this structure.

- McCormick House

Since no effect is anticipated for this structure, no mitigation is necessary.

- Great Island Bridge Toll House

Since no effect is anticipated for this structure, no mitigation is necessary.

- Lower Lockport Historic District (including Lock No. 34 and Lock House)

Removal of each significant component of this district may be mitigated in two ways: relocation and recordation. Relocation of the entire district is not only highly impractical, it also is inappropriate since the district derives much of its significance from the flood plain setting. Recordation of these structures to standards established by the Historic American Buildings Survey and Historic American Engineering Record is the most appropriate mitigative option. Only through measured drawings or photographs can the vital relationships between structures and setting be properly documented.

- John Hanna House

Removal of this structure may be mitigated by either relocation or recordation. Although both options would be appropriate, the financial considerations of each should be weighed carefully in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation before any decision is reached.

- William Hanna House

Removal of this structure may be mitigated by either relocation to a suitable site above proposed flood limits or recordation to standards established by the Historic American Buildings Survey. This decision should be reached in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation.

7.0 THE BALD EAGLE CROSS-CUT CANAL

7.1 Historical Background

From the perspective of the 1980's it is perhaps difficult to visualize the impact that the state canal system of Pennsylvania had on the economy of the towns and industries which were fortunate enough to be in close proximity to one of the new navigable waterways. Before the canal era, movement of consumer goods to the inhabitants of the "back country" and the export of raw materials and semi-finished products such as lumber and pig iron were dependent on inadequate roads and risky seasonal water transportation. The construction of the state system of canals in the late 1820's and early 1830's revolutionized the transportation system of Pennsylvania. For the first time, reliable, cheap movement of goods was possible, with only seasonal shutdowns in the winter when the canals were drained to prevent frost damage, and occasional closures due to storm damage.

The growth of the canal system in Pennsylvania was impressive (Figure 7). At its maximum the state had approximately 1250 miles of canal (McCullough and Leuba 1973:v). Traditionally, the impetus to develop the state system is attributed to the success of the Erie Canal in New York State. With the opening of the Erie in 1825 and its immediate prosperity, Pennsylvania was spurred to begin work on its own canal system (Drago 1972:203). Three canal acts were passed by the state in

1824, 1825, and 1826, and work started on what became known as the "Main Line Canal" on July 4, 1826, at Harrisburg (Shank 1981:14).

The Main Line was divided into three sections, designated the Eastern Division, the Juniata Division, and the Western Division (Figure 7). Various branch lines were constructed and the state system was also linked to various private canals such as the Union Canal, which joined the Schuylkill and Susquehanna Rivers, and the Schuylkill Canal, which ran from Port Carbon to Philadelphia. Part of the state system was the West Branch Canal, which followed the course of the Susquehanna from Northumberland in Northumberland County to Farrandsville in Clinton County. The West Branch Canal was begun in 1828 and completed in 1835. Over the 73 miles of its length there were 19 locks which had a combined lift of 138-1/2 feet (Shank 1976:84-85).

For the 73 miles of canal three principal engineers were appointed, James D. Harris, Robert Faries, and William E. Morris (Rhodes 1976:11). The canal was divided into three sections. The first 24 miles north of Northumberland was known as the "Muncy Line," while the remainder became the "Upper Lycoming" and "Lower Lycoming" lines (Canal Commissioners 1833-34:28). Although the construction of the canal was authorized by the Canal Commissioners on March 24, 1828 (Linn 1883:170), it was not until 1831 that engineers were appointed. In that year John Mitchell, one of the Canal Commissioners, wrote to James D. Harris in Harrisburg appointing him as principal engineer on the Lycoming Line, together with

Robert Faries (Mitchell Collection, April 5, 1831). In the letter it is stated that Harris was to have a salary of \$1,750 per annum and that "the line [was] then to be divided as near the middle as circumstances will permit of, the upper part assigned to you and the lower to Mr. Foris [sic] for construction" (Mitchell Collection, April 5, 1831).

7.2 History of the Canal

Included amongst James Harris' responsibilities was the construction of the Bald Eagle Cross-Cut Canal. The West Branch Canal was, of course, a slack water canal, whereby portions of it utilized the river where it could be made suitable for navigation. At Lockport, across the river from Lock Haven, the canal entered the river for a short distance before emerging again on its way to its terminus at Farrandsville (Figure 8). Slack water navigation here was made possible by a dam which raised the water level in the Susquehanna. The main function of this dam, however, was to provide water for the remainder of the canal; consequently, it was known as the feeder dam. The Cross-Cut Canal was seen as an extension of the West Branch Canal, which would run between Lock Haven and Flemington on Bald Eagle Creek. The Cross-Cut extended the navigational capabilities of the canal system and served as an extra source of water into the feeder dam.

The long term goal of the promoters of the Cross-Cut, however, was to build a link between its terminus on Bald Eagle Creek and Bellefonte on Spring Creek some 25 miles away in Centre County. James Harris was an active promoter of this idea, as shown by his estimates of both the tonnage which could be carried in the proposed canal and the ensuing profits. He estimated that 22,300 tons of goods could be transported at two cents per ton per mile for a total of \$11,150.00. He also estimated that 500 tons of store goods could be carried at three cents per ton per

mile for a total of \$375.00, making total receipts for the first year \$11,525.00. This estimate is dated 1829, well in advance of the commencement of work on the Cross-Cut Canal (Mitchell Collection 1829).

James Dunlop Harris (1797-1842) had a personal interest in the improvement of navigation on Bald Eagle Creek which, at that time, apparently was not thought incompatible with his service to the state. James Harris, Senior was the co-founder of Bellefonte together with his father-in-law, James Dunlop (Cummings 1951:31) and undoubtedly had commercial interests in Centre County. The voluminous personal correspondence between James Dunlop Harris and his brother, Joseph, indicates that they possessed substantial property such as iron works and grist mills in the area (Mitchell Collection, May 23, 1828). Accordingly, it is obvious that the financial interests of the Harris family would have been increased by improvements to the transportation system of the area.

In 1831 there was apparently a resolution from the citizens of Howard Township requesting the extension of the canal system to the mouth of Bald Eagle Creek (Mitchell Collection, May 1981). Commissioner John Mitchell commented on this to James Harris in a letter as follows:

The Board has not yet acted upon the application of the people from Centre, nor cannot until we report to the Legislature. Their claim under the law for a connection with the Bald Eagle is

a strong one, but the construction of a high dam for that purpose will meet with great opposition among the people, if not the Board (Mitchell Collection, November 1, 1832).

In the same letter, however, there is a mention of some kind of legal problem in putting "under contract the feeder line of your canal" (Mitchell Collection, November 1, 1832). The use of the term "feeder line" suggests that the official view of the Cross-Cut was that its primary function would be to supply extra water to the feeder dam at Lock Haven. Navigation on the Cross-Cut would be an added bonus, practical only when freshets made it possible for arks to use Bald Eagle Creek and gain access to the canal. Whatever the legal problems were, they were surmounted and, on April 12, 1833, the Bald Eagle side cut was put under contract (Canal Commissioners Report 1833-34:155).

On April 27, 1833 James Harris was able to report to John Mitchell that

I have finished locating the line connecting the river with the Bald Eagle. The line meets the river about 40 rods above Dr. Henderson's house and about midway between his house and the corner of his land and Mrs. Hunt's. . . (Mitchell Collection April 27, 1833).

In a letter dated May 13, 1833, John Mitchell acknowledged the receipt of a survey map of the proposed line and instructed Harris to change the position of the outlet lock "and point it as much as possible down the

stream . . ." (Mitchell Collection, May 13, 1833). The object of this was to prevent silt from building up near the outlet and clogging it. The survey map (Figure 9) shows a nine foot lift lock at "Old Town" (Lock Haven), and the length of the proposed canal as three miles and thirty-eight chains.

Based on this survey map contracts for the Cross-Cut Canal were let in June 1833, and it was estimated that the canal would be ready for water in early spring 1834 (Canal Commissioners Report 1833-34:156). The cost of the canal, which included a dam on Bald Eagle Creek four and a half feet high and 310 feet wide, was estimated at \$45,636.37-1/2 (Canal Commissioners Report 1833-34:155-156). Included in this cost was the excavation of the canal bed and the construction of one lift lock, one wooden guard lock near Bald Eagle Creek, four public bridges, six farm bridges, and one culvert (Canal Commissioners Report 1833:34:156).

As was customary at the time, the work of building the canal was distributed amongst a number of small contractors. A map and profile of the canal (Figure 10) shows that the canal was divided up as follows: Lock Section 1, 1.5 chains (99 feet); Section 1, 42 chains (2,772 feet); Section 2, 36 chains (2,376 feet); Section 3, 42 chains (2,772 feet); Section 4, 40 chains (2,640 feet); Section 5, 43 chains (2,838 feet); Section 6, 42 chains (2,772 feet); Section 7, 22-1/2 chains (1,485 feet). Thus, the total length of the canal was 17,754 feet, or 3.36 miles from the outlet lock at Lock Haven to the guard lock at Bald Eagle

Creek. The map also gives the lift of the outlet lock as eight feet, as opposed to the earlier map (Figure 9), which gives it as nine feet.

The prism of the canal was 40 feet by 28 feet by four feet (Baer 1981:Appendix A). That is, at water level the canal was 40 feet wide. At the level of the canal bed it was 28 feet wide, and the depth of the water was four feet. The outlet lock into the Susquehanna measured 90 feet long by 17 feet wide (Baer 1981:Appendix A). A description of the outlet lock was given by James Harris in his report on the canal dated October 31, 1833 as follows:

The lockage from the bottom of canal of the Bald Eagle side-cut, to the bottom of canal of the feeder is eight feet, which is overcome by one lock at the pool of the feeder dam. A pair of reversed gates is attached to the head of this lock to guard against an influx of water from the river at a time of high floods, answering all the purposes of a guard-lock. The walls at the head of the lock are raised five feet higher than usual in a lift lock. No other lock is required on the side-cut except a guard-lock at the Bald Eagle which is being built of wood (Canal Commissioners Report 1833-34:172).

The fabric of the lock was not specified by Harris in this report. Some details of the type of construction are given, however, in a later report of James Harris dated October 30, 1834. In this report the cost of building the outlet lock is given as \$10,431.10, which included a

payment of \$717.00 for "extra stone work" and a large amount of "cut stone" (Canal Commissioners Report 1834-35:HR.23-No. 17). In a letter written in 1830, Harris described the three kinds of lock being built on the West Branch Canal. These consisted of stone locks, wood and stone locks, and wooden crib locks (Mitchell Collection, October 8, 1830). Of the three types the one "which was preferred was that of wood and stone combined. . ." (Mitchell Collection, October 8, 1830).

This was the type of lock which appears to have been built on the West Branch Canal and a good example survives on the north bank of the Susquehanna at Lockport. The Lockport lock has dressed stone quoins and gate recesses, and the top courses on each side of the lock are also dressed stone. Below these top courses the stone work is rougher, and there are insets in the walls which held a wood frame to which a wooden plank lining was nailed. The outlet lock may have been similar to this, with the exception of the higher walls at the head of the lock.

Another difference is the reference to "reversed gates" at the head of the lock. Normally, lock gates open against the flow of water in a canal. When they are closed the pressure created by the flow of water in the canal keeps them closed. The outlet lock had an eight foot lift, so that if the water level in the Susquehanna rose above that level under flood conditions, the pressure would be reversed and the river could flood the canal and damage the banks. To guard against this,

Harris chose to install the "reversed gates" and raise the level of the lock wall by five feet at the head of the lock.

No drawings of the outlet lock have been located, and in their absence it is difficult to know precisely how the reversed gates functioned. The original deed map of the city of Lock Haven drawn up in 1833 by Jerry Church, however, provides a clue. There are many published versions of this map (cf. Wagner 1982: 9; Sesquicentennial Book 1983:2; Miller 1966:80) which show a conventional type of lock with both gates pointing up stream. The original version from which these are taken is somewhat different (Plate 4). At the head of the lock shown in this map is an X-shaped configuration. This is interpreted as representing two separate lock gates, each independent of the other. In normal use the lower of the two would be closed and the upper gate would be open against the gate recess. In times of flood the positions would be reversed, with the upper gate closed and the lower one open. The extra five feet of wall at the head of the lock and the eight feet of lift would mean that the water level in the river would have to rise at least thirteen feet before it threatened the canal.

Work progressed rapidly on the construction of the cross-cut, although there was one major disturbance which centered around the outlet lock, James Harris reported on this to John Mitchell on September 1, 1833, as follows:

We have had one or two riots among the hands about the dam. On Friday, the 23rd, two Irish hands working at the lock-pit of McMurtree (outlet) were pulling some apples in Mrs. Hunt's orchard. Jesse, a son of the widow, shot one of them with small shot and wounded him slightly. This exasperated the Irish generally in the pit and they soon formed the idea that the boatmen, who are boating straw to the dam, took part with Hunt. As the shanty of the boatmen is contiguous to that of the Irish, threats were very soon passed from the Irish. The boatmen took it up and prepared themselves with some arms. The Irish commenced the attack with spades and picks. In this affray an Irishman was shot and stabbed. His wounds are not likely to prove mortal. One boatman had his chin split with a spade. He is on the recovery (Mitchell Collection, September 1, 1833).

On the following Saturday and Sunday there was more fighting. James Harris, who at the time was downstream at Jersey Shore, heard of this activity and, with the aid of "a considerable force", succeeded in quelling the disturbance (Mitchell Collection, September 1, 1833).

Apart from this "ethnic conflict", work was proceeding on the seven sections of the canal. By October 31, 1833, \$8,155.00 had been expended on the sections (Canal Commissioners Report 1833-34:HR. 41-No. 28). This was approximately half of the amount allocated for this part of the project and presumably the work of excavation, embanking, puddling and rip-rapping was half completed. Some problems were encountered,

however, because of soil conditions. In his report dated October 31, 1833, James Harris stated:

On all those sections, except No. 1 about eighteen inches of the surface is easy excavation, at this depth a sub-stratum of genuine hard pan is found, consisting of hard tough clay intermixed with bog ore. This circumstance is favorable to a tight canal, but increases the cost (Canal Commissioners Report 1833-34:172).

Work was also proceeding on the wooden guard lock at Bald Eagle Creek. Some problems were apparently encountered there as indicated by the following warning from Canal Commissioner John Mitchell:

I would impress upon you the necessity of your attention to the Bald Eagle Lock, without an alteration that work will be spoiled, they must get better material and make better work (Mitchell Collection, October 25, 1833).

The Bald Eagle lock was located below a new crib dam being built on Bald Eagle Creek. The dam was four and a half feet high and 310 feet wide (Canal Commissioners Report 1833-34:155-156). The function of the dam was to provide an adequate supply of water to the canal. It would also create a slack-water pool upstream from the dam which would increase its potential for navigation by arks and rafts. Some of the major opponents of canal construction were rivermen who wanted to continue to transport

goods on rivers and creeks at no cost, rather than pay the tolls exacted on the canals. To accommodate these individuals, chutes were built at the dams to enable river craft to pass the obstruction created by the dam. These chutes also acted as an overflow apron for the dam.

In effect, the Bald Eagle Dam should be regarded as a storage dam with the overflow being channeled into the chute. This type of dam was much more economical to build than an overflow weir, in which the entire crest of the dam would act as a spillway (Molloy 1980:319). Despite the loss of income to the canal from the continuance of river traffic, it was in the interests of the Canal Commissioners to build the cheaper type of dam. John Mitchell reiterated this to James Harris in a letter dated May 5, 1833.

A shute will be necessary in the Bald Eagle dam to pass arks and other craft. If it can be made of stone so much the better. Wooden shutes are subject in every flood to be racked and at a time when the craft is running and nothing can be done towards repairing until the flood is gone by (Mitchell Collection, May 5, 1833).

The Canal Commissioners reports indicate that a stone chute was built at the Bald Eagle Dam. The accounts for the dam include line items for "stone filling in Schute", and Paving in the schute" (Canal Commissioners Report 1834-35: HR. 23 - No. 17). The river dams were the weak point of a slack water canal system, since any damage to them

reduced the head of water available to feed the canal. If the damage was severe enough, it could halt traffic. John Mitchell was obviously conscious of this when he wrote to James Harris in reference to the Bald Eagle Dam, "in the execution of public works permanency and security is really more important to the public than the expense of construction" (Mitchell Collection, May 5, 1833). Despite these strictures, it was necessary to carry out repairs to the dam in 1839, at which time a contract was issued to Killiam Epley and Company on August 25 for work which had to be completed by December 1, 1839 (State Archives 1839).

By 1834, work on the canal had been completed. James Harris reported on the opening of the canal as follows:

The water was first admitted into the Bald Eagle side-cut on the 4th of July. It has been in constant navigable order since the first of September, and it already begins to give evidence of its importance to the neighborhood, in the traffic which has been commenced between the coal mines and the Bald Eagle Valley, chiefly in the transportation of coal to the Bald Eagle, and in carrying bog iron, pigs, castings, lime, agricultural products and merchandize (Canal Commissioners Report 1834-35:111).

The estimated cost of the canal had been \$45,626.37-1/2 (Canal Commissioners 1833-34:156). The actual cost upon completion was \$47,850.01, a little over \$2,000.00 more than the estimate (Canal Commissioners Report 1834-35, HR. 23 - No. 17). Details of the cost of

each section and feature of the canal and the names of the contractors are given in Table 3.

The state canals were expected to be profitable, and toll houses were erected at each lock to collect money for the privilege of using the canal. As Table 3 shows, lock houses were built at the guard lock and at the outlet lock. The lock house at the outlet lock was on the west side of the canal between the canal and the Washington House (Furey 1892:103). The location of the lock house at the guard lock is uncertain but, given the proximity of the guard lock to Bald Eagle Creek, it seems likely that the house would have been on the north side of the canal, away from the river.

Upon completion of the state section of the canal, the attention of local business interests was directed toward raising funds for the construction of the Bald Eagle and Spring Creek Canal, linking the town of Bellefonte on Spring Creek, Centre County with the Cross-Cut Canal at Flemington. The parties interested in this project had to petition the state legislature in order to get permission to build the canal. The act to incorporate the canal company was passed on April 14, 1834 and, by May of 1835, the "Bald Eagle and Spring Creek Navigation Company had succeeded in raising \$200,000.00 with which to build the canal" (Burnside 1835:1). The Lower Division from Bald Eagle Creek to Howard Furnace was in use by 1837, and the Upper Division from Howard Furnace to Bellefonte was completed circa 1847 (Coleman 1972:np).

The completion of the Bald Eagle and Spring Creek Canal obviously led to greatly increased traffic on the Cross-Cut Canal. Pig iron and bar iron was transported on the canal from the forges and furnaces located on its banks to the industrialized cities of Pennsylvania, and store goods and finished products were carried back. Agricultural products, such as flour and vegetables, were also transported. The Cross-Cut Canal also stimulated industrial growth in the City of Lock Haven itself. The 1862 map of the City shows several canal basins located along the canal which were used by the lumbering industry and a foundry (Plate 2). In an 1872 map six industrial plants are shown located on the canal (Wagner 1982:105). Industrial development also proliferated in other areas of the city. An increase in population followed, from about 800 in 1850 (Meginniss 1857:447) to 3,640 in 1862 (Walling 1862). Lumbering was an important industry throughout this period. Indeed, the log boom constructed across the river in 1850 held as much as 75,000,000 board feet of lumber with which to feed the nine local saw mills (Hay, Deans and Israel 1979:II:14).

The canal was also used by travelers. The Governor of Pennsylvania, Joseph Ritner, visited Lock Haven by canal boat in 1838 and held a Canal Commissioners meeting there. Another distinguished visitor was "General Tom Thumb" who arrived by canal along with "P. T. Barnum's Grand Colossal Museum and Menagerie" in order to appear at the Court House (Mix 1978:7-8). Another reference to travellers on the canal appears in the Lock Haven Democrat for June 1, 1876 in a story about a proposed

trip from Lock Haven to Philadelphia by packet boat to see the Exposition (Mix 1978:7).

The advent of the railroad saw the eclipse and eventual demise of most canal systems. The canal in Lock Haven was no exception. In 1857, the Main Line Canal was sold by the state for \$7,500,000.00, and in 1858, the remainder of the state system was sold to the Sunbury and Erie Railroad for \$3,500,000.00 (Shank 1981:95-96). The Sunbury and Erie sold the West Branch and the Susquehanna Divisions to the West Branch and Susquehanna Canal Company for \$500,000.00 in the same year (Sunbury and Erie Railroad Report 1859:7). The West Branch and Susquehanna Canal Company operated until 1873, when it was bought by the Pennsylvania Canal Company (Baer 1981: Appendix A).

In spite of stiff competition from the railroads, some improvements were made to the canal under the ownership of the Pennsylvania Canal Company. A newspaper report of February 5, 1880 stated that the canal was to be deepened (Wagner 1982:128). In order to deepen the canal it would be necessary to either raise the banks or to excavate the bottom of the canal. It was recognized by contemporary sources that it was simpler and less expensive to raise the banks than to deepen the bottom of the canal (Sweet 1880:100-101). Deepening the bottom of the canal would involve lowering the sill of the lock at the upper gate and also removing the puddle lining of the canal bed and then replacing it after the bottom had been deepened. In view of the fact that the outlet

lock was already five feet higher than normal at the upper end, it would have been unnecessary to make any alterations to the masonry if the banks were raised. Accordingly, this seems the obvious course to have taken. The major advantages to be gained from making the canal deeper were the increase in the amount of freight that boats could carry in a deeper canal and the decrease in resistance to the passage of a boat which results when the volume of water in contact with the submerged portion of a boat is increased (Sweet 1880:99-110). In the case of the Cross-Cut Canal it is uncertain which method of deepening the canal was used.

The Pennsylvania Canal Company was a subsidiary of the Pennsylvania Railroad (Shank 1981:96) and operated the West Branch Division and the Cross-Cut until 1889. On May 30, 1889 a freshet damaged all the canals owned by the company, including the West Branch Division which "was destroyed to a considerable extent throughout, and west of the Loyalsock was mostly obliterated" (Pennsylvania Canal Company Report 1889:3). The portion "obliterated" included the Cross-Cut Canal, and the entire division west of Loyalsock, comprising 35.3 miles, was legally abandoned (Pennsylvania Canal Company Report 1889:3-4).

One exception to this, however, was part of the Cross-Cut Canal in Lock Haven. On November 5, 1889 this portion of the canal was sold to the Philadelphia and Erie Railroad Company for \$75,000.00. The portion of the canal sold was described as follows:

All the lands premises and structures now or heretofore occupied by the portion of the Bald Eagle Cross-Cut of the Pennsylvania Canal in Clinton County which have been abandoned for purposes of navigation. Beginning at Bridge No. 190 near the lower end of Paper Mill Basin being distant two miles and thirty three hundredths of a mile from the head of the guard lock at Bald Eagle Dam and extending thence (passing through the City of Lock Haven) the distance of one mile and four hundredths of a mile more or less to the outlet into the West Branch of the Susquehanna River (Clinton County 1889).

Under the terms of an agreement dated February 1, 1907, the Pennsylvania Railroad acquired all the property of the Philadelphia and Erie Railroad, and on March 10, 1914, the Pennsylvania Railroad sold the property to Charles Kiger et al. (Clinton County 1914). It has proved impossible to trace ownership of the canal since this transaction, but the property is currently maintained by the City of Lock haven. A newspaper item published in the Lock Haven Express shows a photograph of the canal bed dated circa 1910-1915 looking north toward the river from Church Street. The accompanying article states that "it was being used as a dump and became such an eyesore that it stirred some of the civic minded ladies of the city to action" (Lock Haven Express July 9, 1968). According to the story, this action consisted of persuading the Pennsylvania Railroad to sell the land to the city. This being accomplished, it was subsequently filled in and used as a park (Lock Haven Express July 9, 1968). This is the present status of the area.

Only one photograph of the outlet lock which shows any detail has been located (Plate 5). This photograph was taken by John W. C. Floyd, a photographer who was active in Lock Haven from circa 1882-1898 (Wagner 1982:6). The photograph shows the upper gates of the lock looking north toward the river. The bridge over the lock at Water Street is shown, as is the approach to the lock, which seems to be lined with timber. Also faintly visible are the balance beams for the upper lock gates, indicating that the gates were balance beam miter gates. No details of the lower gates can be seen on the photograph. The canal banks and the lock appear to be in good order, and presumably the photograph shows the area as it was before the freshet in 1889.

A series of Sanborn Insurance Maps also shows some details of the lock. The 1885 map shows the lock with the conventional symbol for balance beam gates (Figure 11). Of some interest is the fact that the upper gates are in the reversed position, as they would be in times of flood. The 1891 map shows the upper gates in the normal position (Sanborn 1891). By 1901 the gates are no longer shown, although the wooden bridge and a foot bridge are shown at Water Street (Sanborn 1901). In 1903 sewer lines were laid in the bed of the canal (Hannegan 1984) and presumably the canal was filled in at this time. The lock is no longer shown on the 1906 map, and a six inch water pipe had been laid across the former site of the lock (Sanborn 1906). While the water pipe may have disturbed the upper portions of the lock walls, it seems unlikely that the sewer pipes have caused any serious damage to the lock, since

they were laid at a depth of seven to eight feet on the existing bed of the canal (Marcinkevage, personal communication 1985). A further sewer which runs perpendicular to the canal is also unlikely to have caused damage, since it is three to four feet deep and to the north of the lock (Marcinkevage, personal communication 1985).

7.3 Technological Significance of the Outlet Lock

Although no detailed drawings of the outlet lock have been located, the documentary evidence pertaining to its construction suggests that it was rather unusual in design. The use of what Harris refers to as "reversed gates" appears to be unique in canal lock construction and, as such, shows the empirical nature of canal building in this period. From his experience as a canal builder and designer Harris was conscious of the problems of locking into rivers, which at times of flood, could swamp a canal. Accordingly, his design at Lock Haven necessitated that water would have to be flowing over the feeder dam at a height of thirteen feet before it would back up sufficiently to flood the canal.

Specialized locks known as guard locks were customarily built at dams on slack water canals to protect the canal below the dam. This precaution was not normally necessary at an outlet lock, which would usually be located several miles up river from the dam. Specialized circumstances existed at Lock Haven, however, where the outlet lock from the Cross-Cut Canal was in close proximity to the feeder dam. This made it necessary for Harris to design a lock which would counteract the very real possibility of flood damage to the canal. How well the reversed gates worked is uncertain, but it may be significant that when the whole of the upper West Branch Division was destroyed by a freshet in 1889, the Cross-Cut was still apparently viable, as indicated by its sale to the Pennsylvania Railroad. Accordingly, the outlet lock at Lock Haven

represents a unique technological response to a challenging set of environmental conditions, thereby making it a significant survivor relating to the technology of nineteenth century canals in Pennsylvania.

It should also further be reiterated that the outlet lock (Section 9.7) is located within the boundaries of the Water Street Historic District, and forms an important element which contributes to the historical characteristics of the District (Clinton County Planning Commission 1984). With this supporting documentation in mind, together with the foregoing discussion on its technological significance, the outlet lock at Lock Haven clearly is an historic resource which is eligible to the National Register of Historic Places. Indeed, it appears to meet Criteria 3 and 4 of the National Register in its own right. Accordingly, the following plan for appropriate recordation of the outlet lock is offered in the event that adverse effects to the resource cannot be avoided. That is, the recordation plan offered below is designed to mitigate potential adverse effects and, accordingly, to obtain a determination of No Adverse Effect from the Pennsylvania State Historic Preservation Officer and the Advisory Council for Historic Preservation.

7.4 Plan for Recordation of the Outlet Lock

In the absence of detailed specification drawings of the outlet lock, archeological excavation remains the only viable option available to record the below grade components of the feature. It seems likely that the middle portion of the lock is under Water Street. Since this segment of the lock is unlikely to yield technological information, excavations in this area are not recommended. However, two separate excavation units are recommended, one in each postulated lock gate area. These excavations should expose the lock walls and any surviving evidence of the gates and hydraulic system, and may need to be quite deep in order to do so. Particular care should be exercised at the gate recesses, where evidence of the "reversed gate" mechanism may be found. The interior fill of the lock should be cleared down to the level of the sills in order to allow the full profile of the lock to be recorded.

After the machine excavations are completed, it will be necessary to undertake some clearance of the lock walls and the bottom of the lock by hand in order to prepare them to be photographed and recorded. Photography and recording of all exposed masonry and any gate or hydraulic features should then be conducted to Historic American Engineering Record standards. This methodology should allow a precise detailed record of the outlet lock and any of its surviving unique technological aspects to be made.

While the "reversed gate" mechanism is of particular significance as an example of a response to a technological problem evidence may also survive of any alterations to the canal lock. For example, if the canal bed was lowered in 1880 when the canal was deepened, at the same time it would also have been necessary to lower the sill of the lock at the upper gate. If no evidence of changes to the upper sill is found, it would imply that the banks of the canal were raised, in which case the sill would have been left in its original position.

Recordation of the outlet lock in the manner prescribed above should result in a fuller understanding of the engineering and building designs created by James Harris in response to a relatively unique and devastating set of environmental circumstances. In so doing, our knowledge of nineteenth century canal building technology will be enhanced, valuable information will be preserved, and adverse effect to the historic resource will be successfully mitigated.

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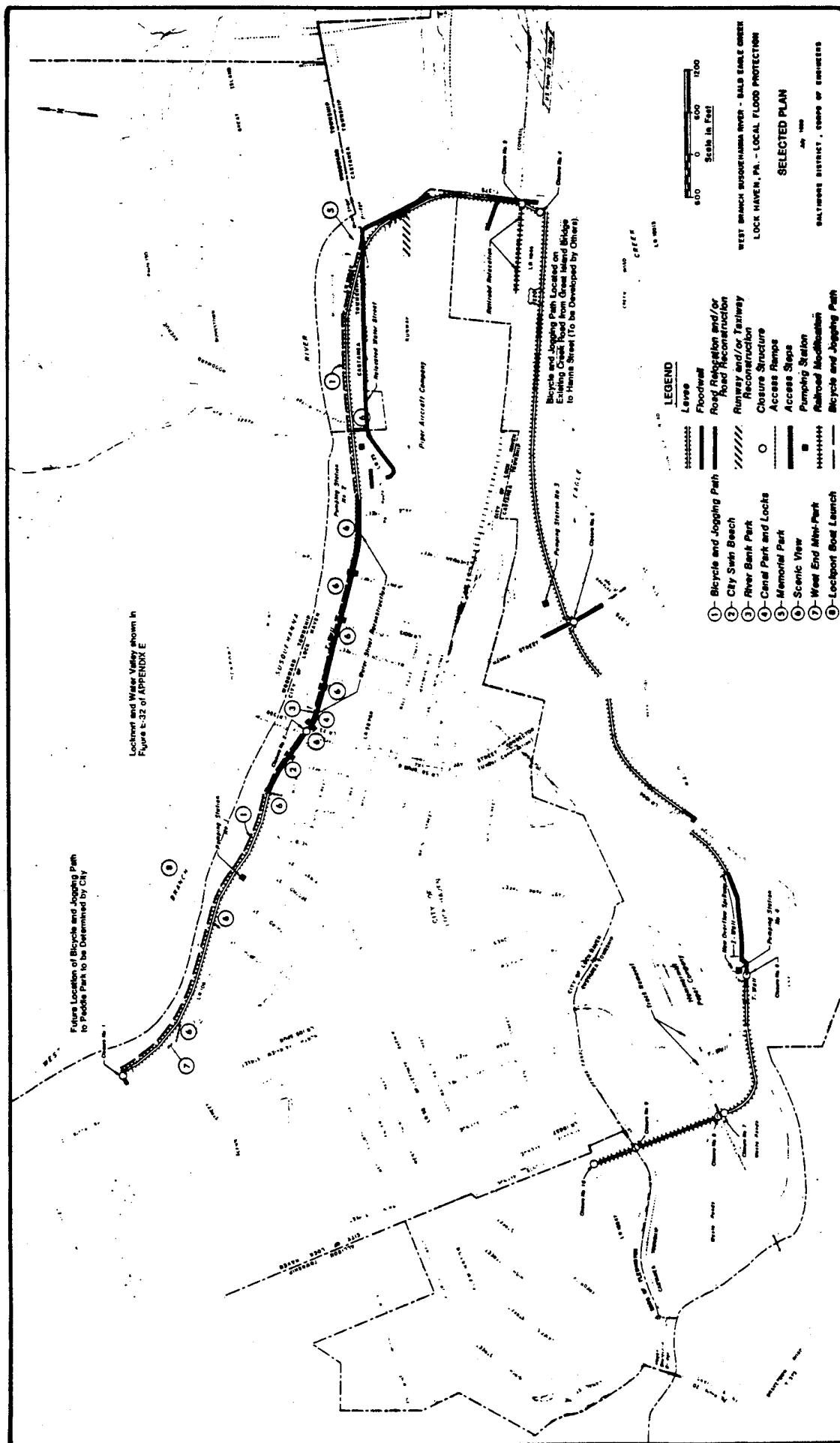
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9.0 Appendices

9.1 Figures



LOCK HAVEN FLOOD PROTECTION PROJECT

Figure 1

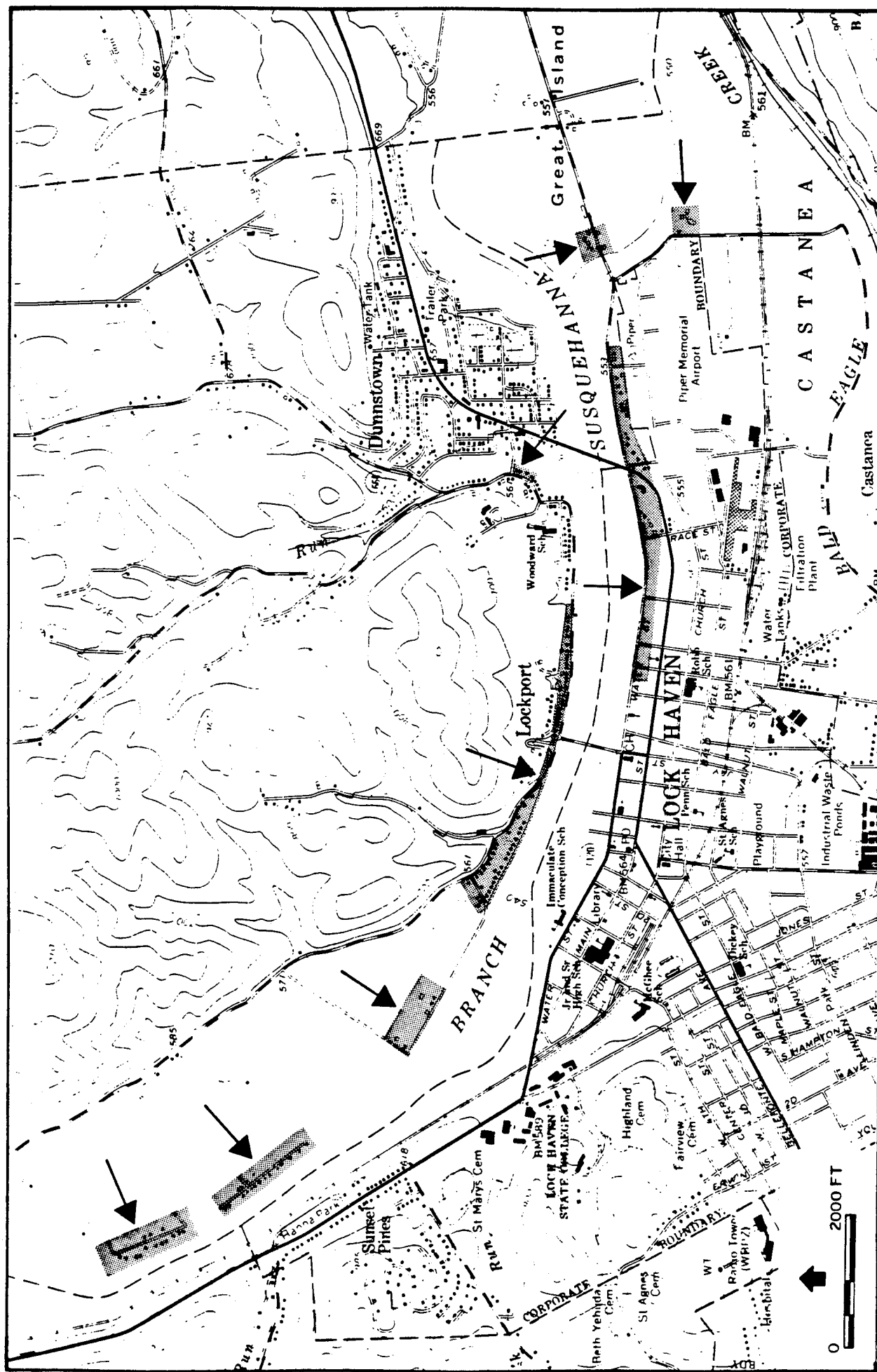
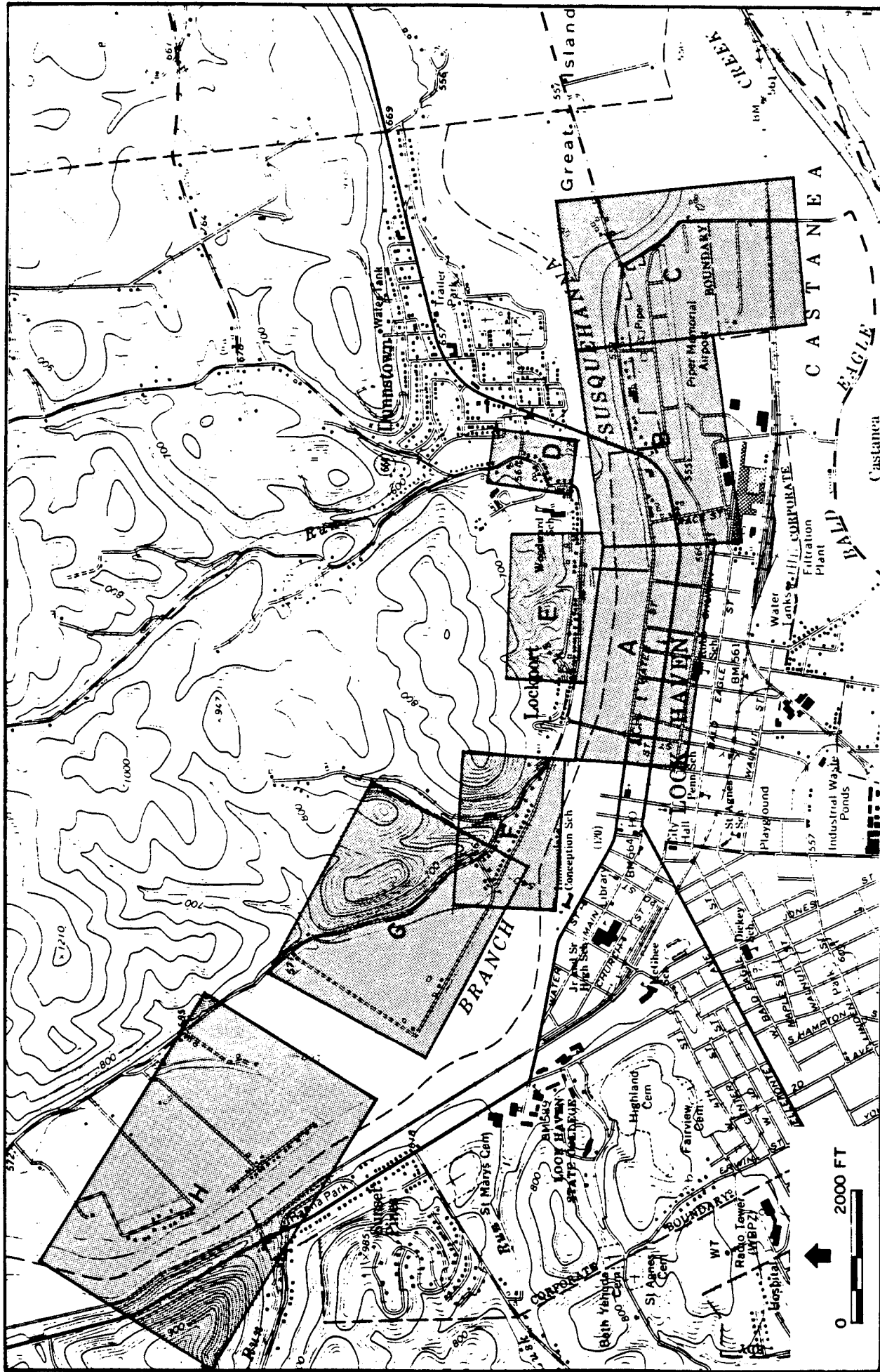
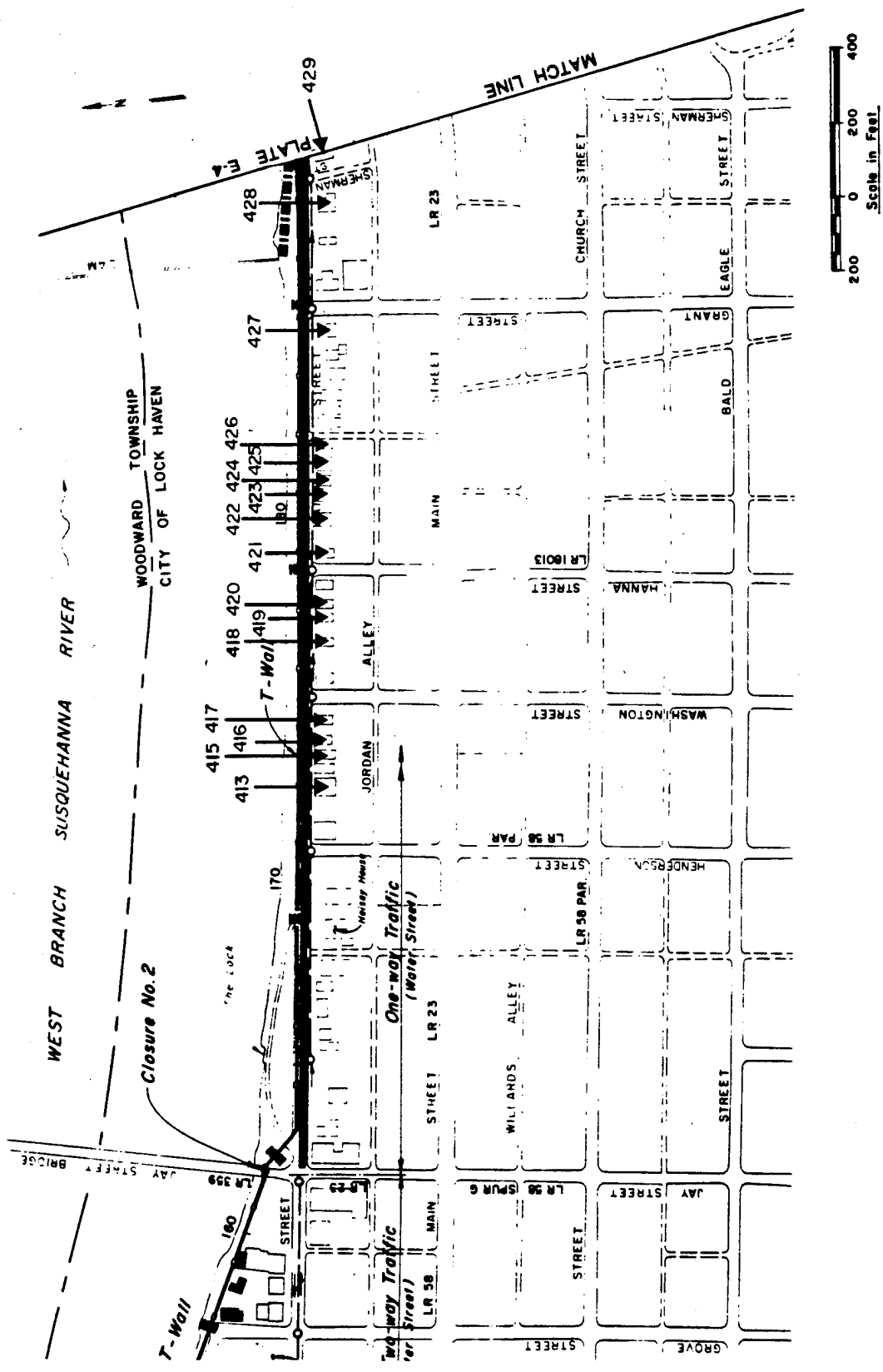


Figure 2

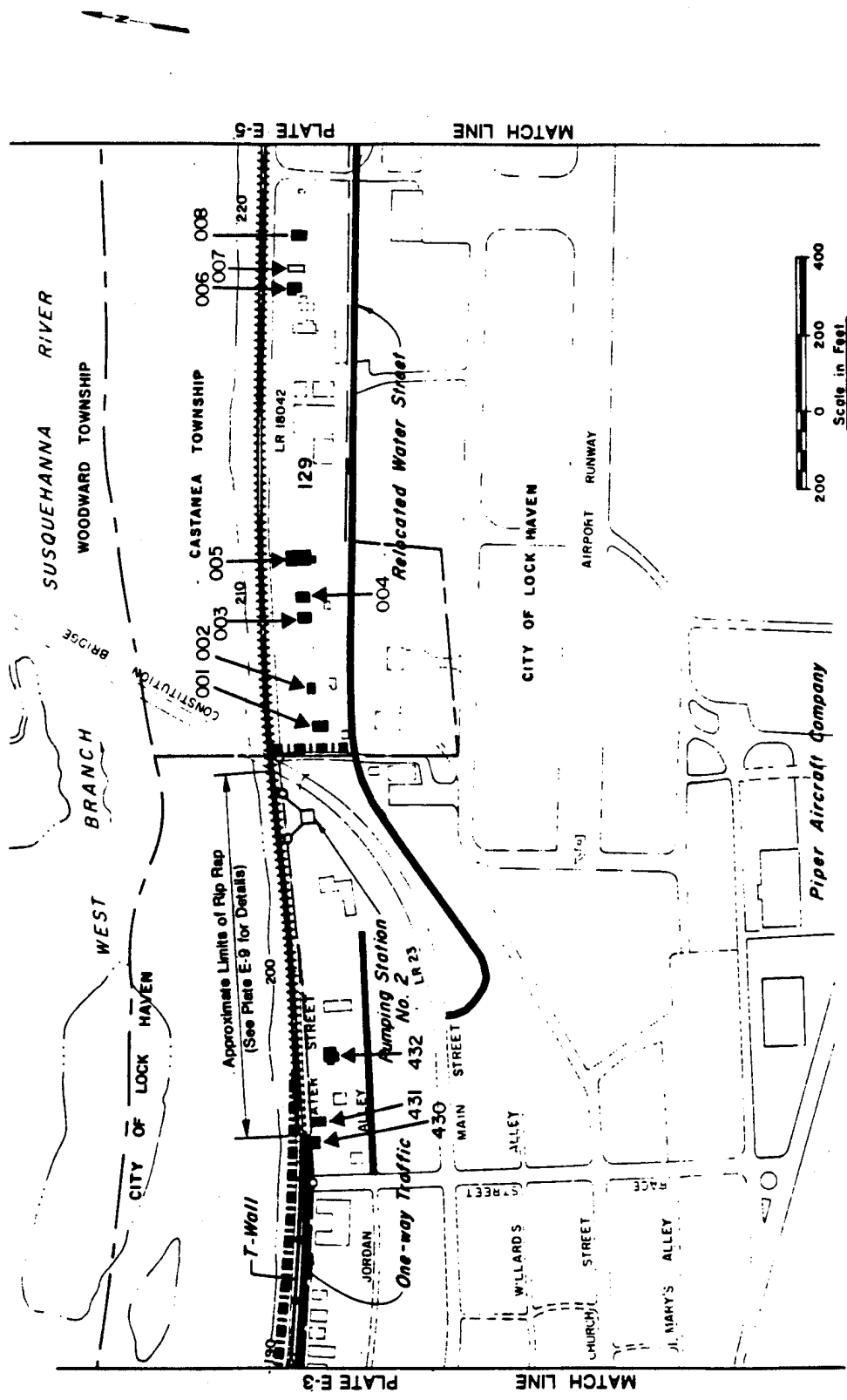


MAP OF PROPERTIES SURVEYED
(KEY TO SHEETS A - H WHICH FOLLOW THIS PAGE)



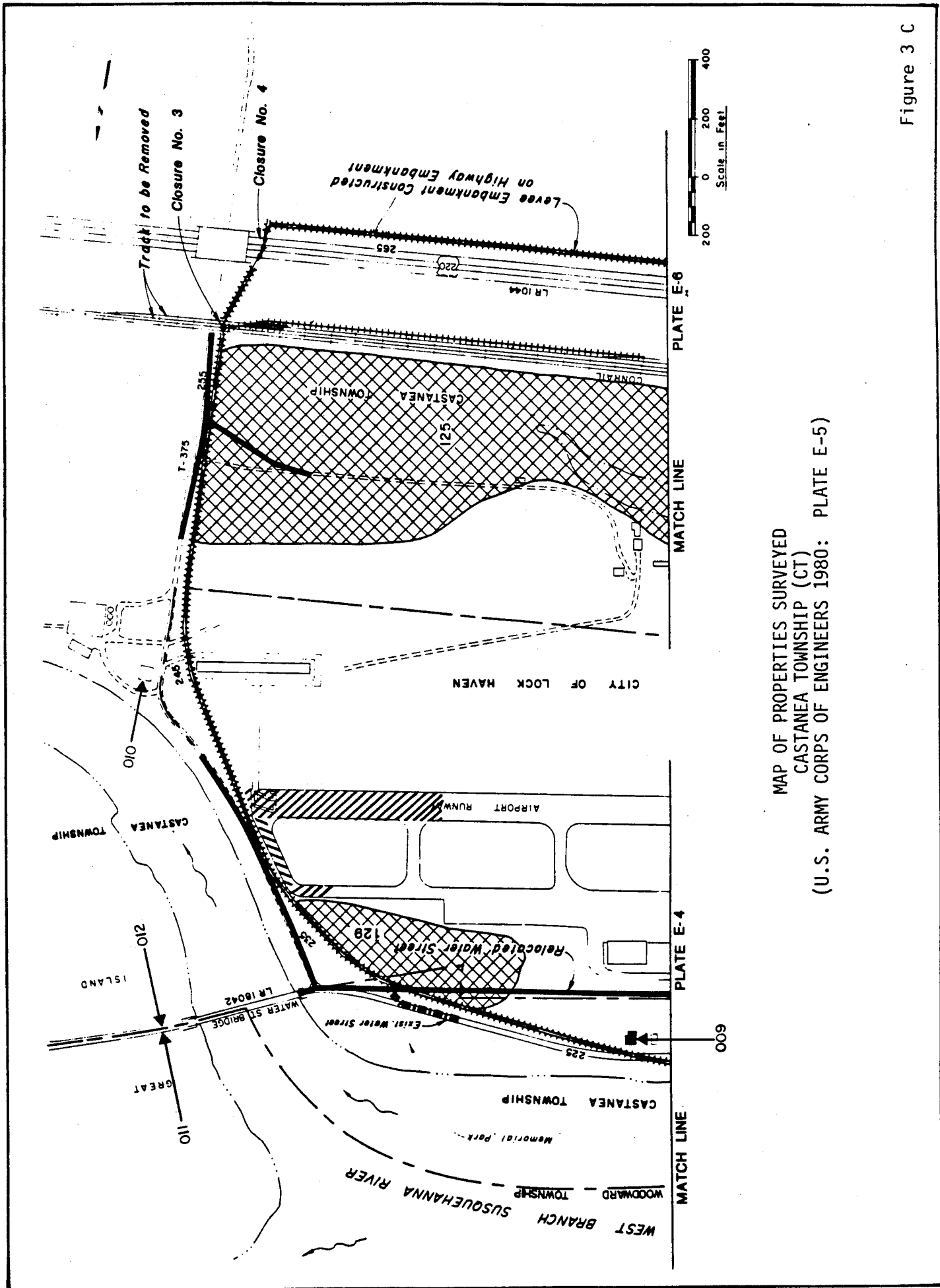
MAP OF PROPERTIES SURVEYED
CITY OF LOCK HAVEN (LH)
(U.S. ARMY CORPS OF ENGINEERS 1980: Plate E-3)

Figure 3 A



MAP OF PROPERTIES SURVEYED
 CITY OF LOCK HAVEN (LH) AND CASTANEA TOWNSHIP (CT)
 (U.S. ARMY CORPS OF ENGINEERS 1980: PLATE E-4)

Figure 3 B



MAP OF PROPERTIES SURVEYED
 CASTANEA TOWNSHIP (CT)
 (U.S. ARMY CORPS OF ENGINEERS 1980: PLATE E-5)

MAP OF PROPERTIES SURVEYED
WOODWARD TOWNSHIP (WW)
(WOODWARD TOWNSHIP TAX MAP, PLATE 1)

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David T. Webb

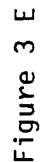
CHURCH

David T. Webb

Figure 3 D

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Boundary of Lower Lockport Historic District



MAP OF PROPERTIES SURVEYED
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(WOODWARD TOWNSHIP TAX MAP, PLATE 3, SHEET 1)

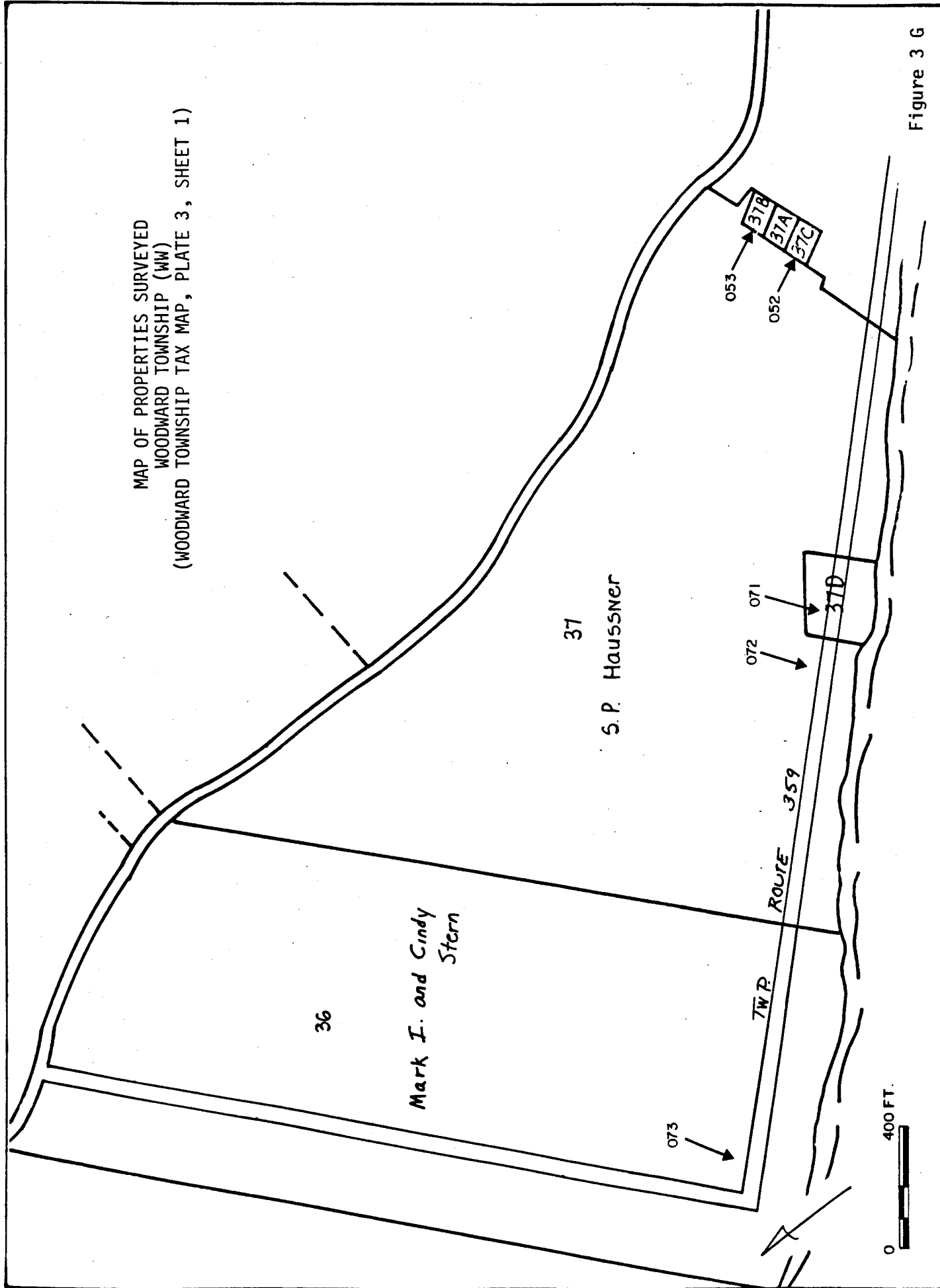
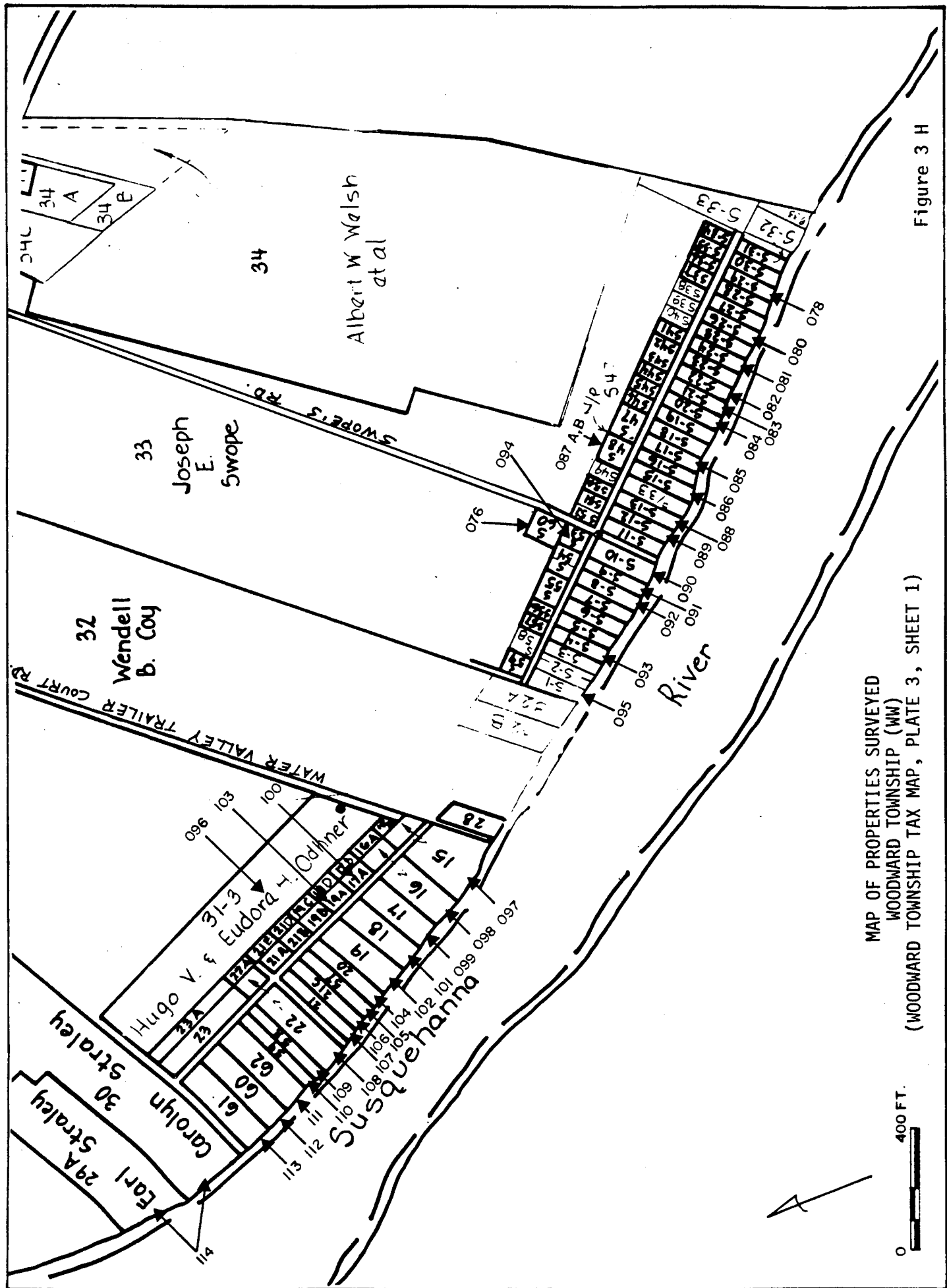
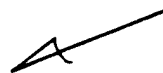


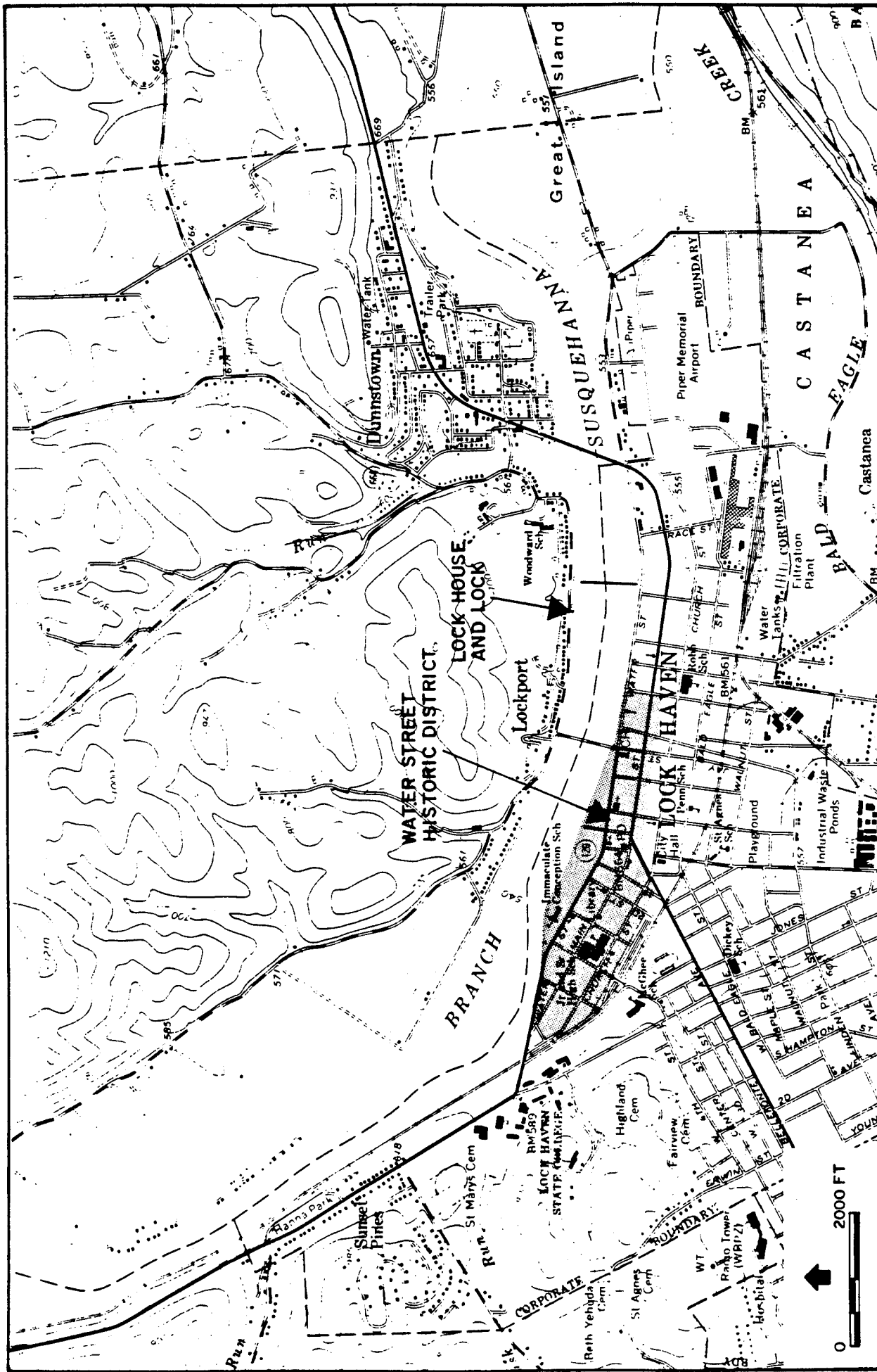
Figure 3 G



MAP OF PROPERTIES SURVEYED
WOODWARD TOWNSHIP (WM)
(WOODWARD TOWNSHIP TAX MAP, PLATE 3, SHEET 1)

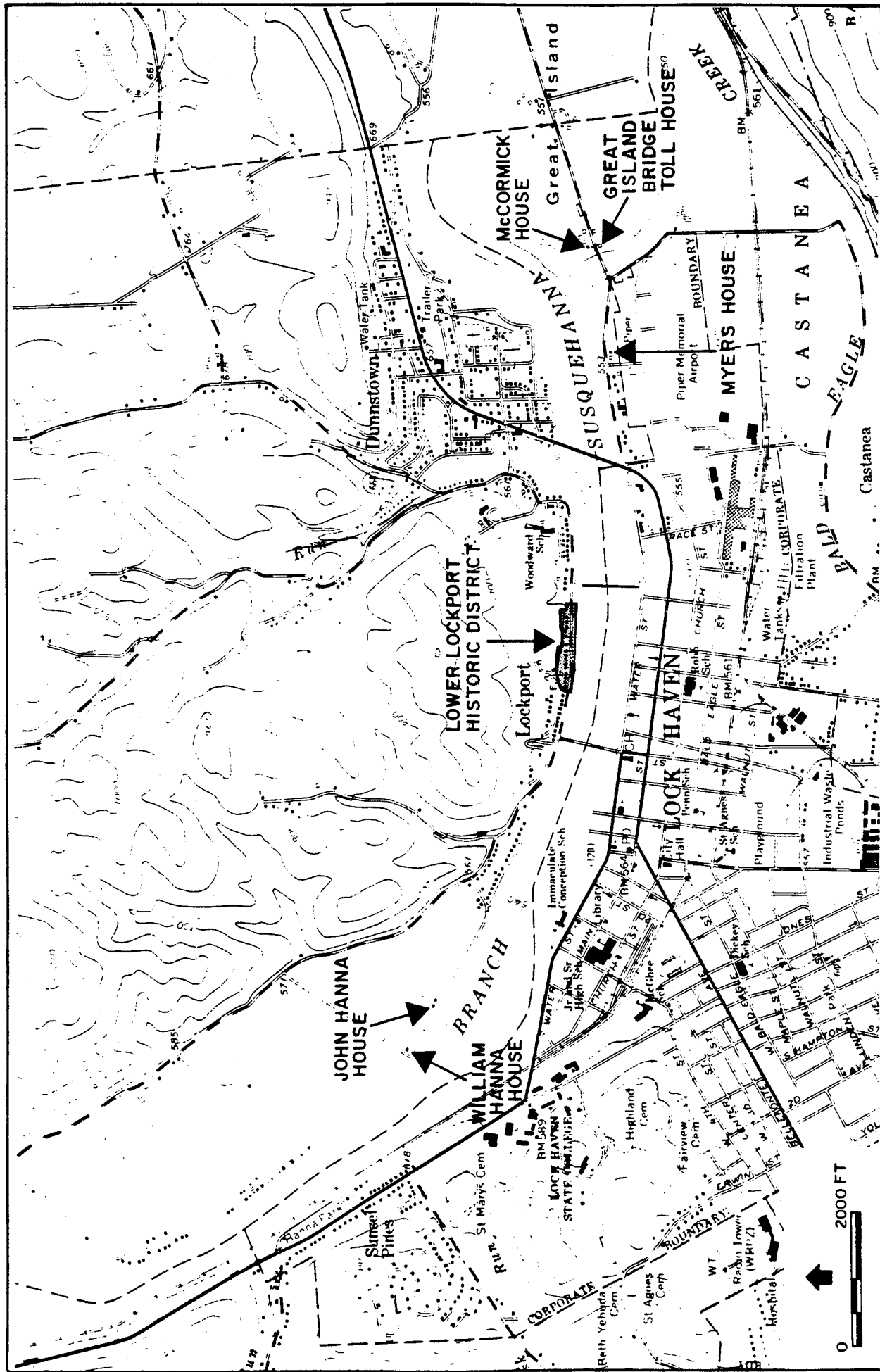
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PREVIOUSLY IDENTIFIED ARCHITECTURAL RESOURCES
 USGS 7.5 Minute Series
 Lock Haven Quadrangle
 1973 Edition

Figure 4

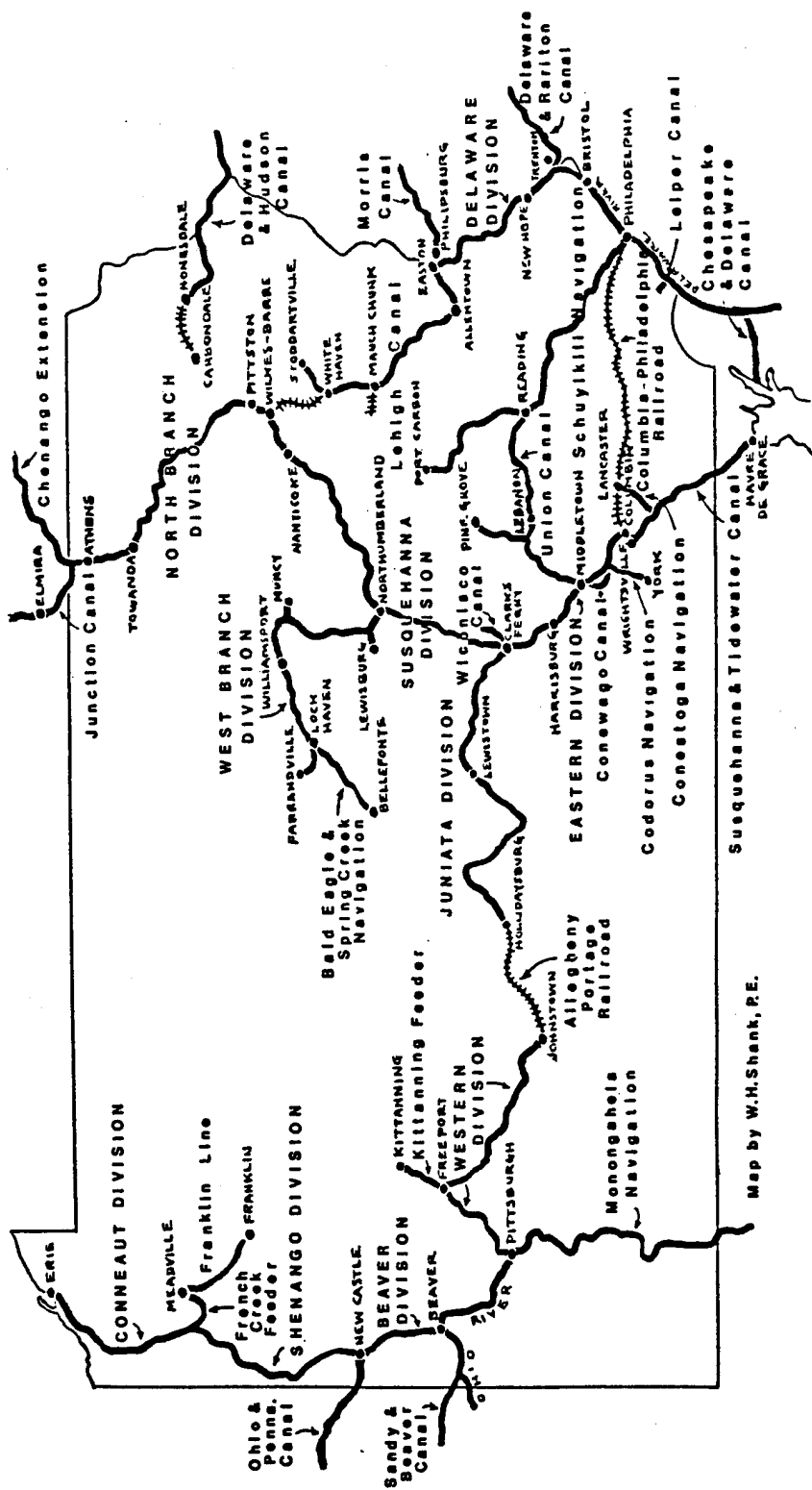


ARCHITECTURAL RESOURCES IDENTIFIED IN THIS STUDY

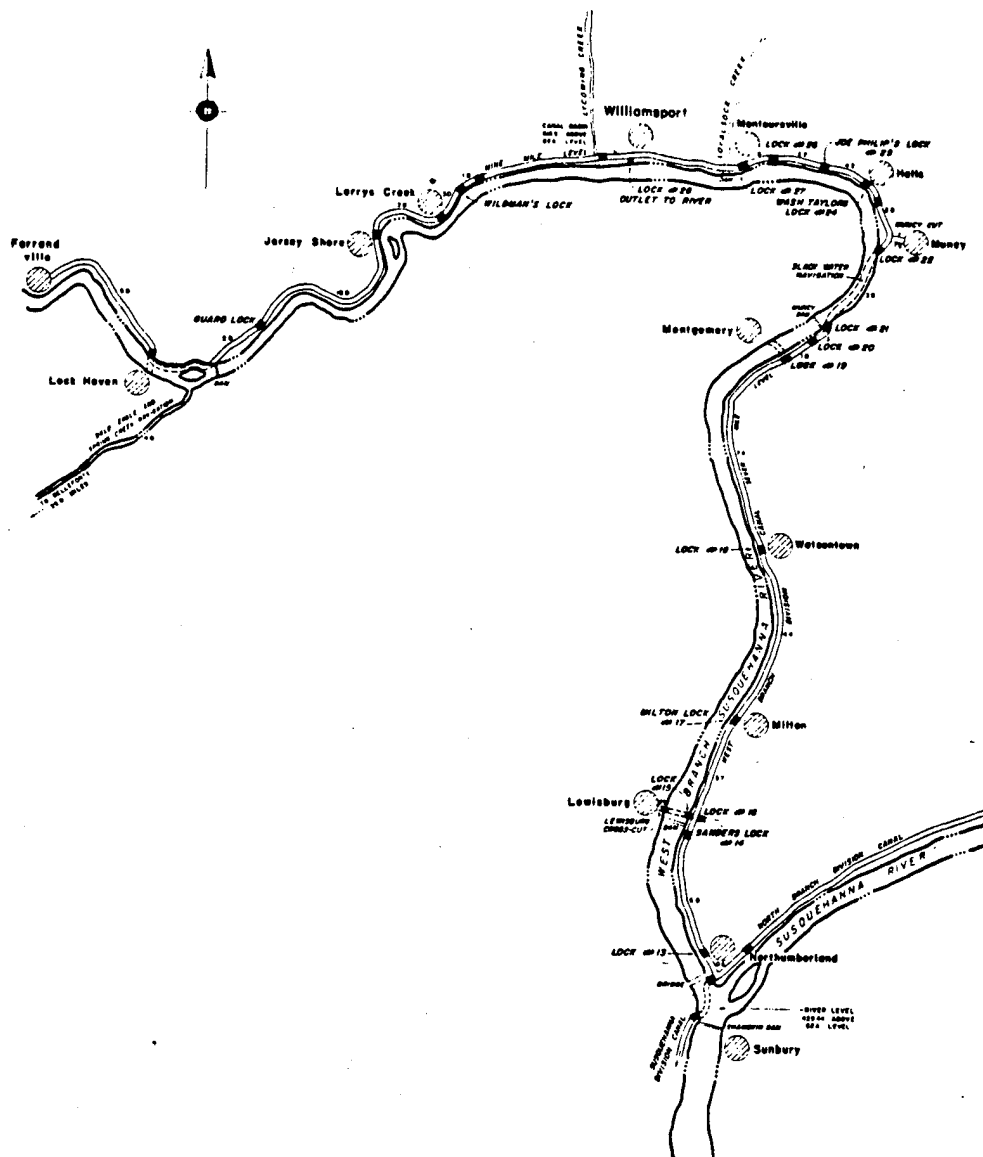
USGS 7.5 Minute Series

Lock Haven Quadrangle

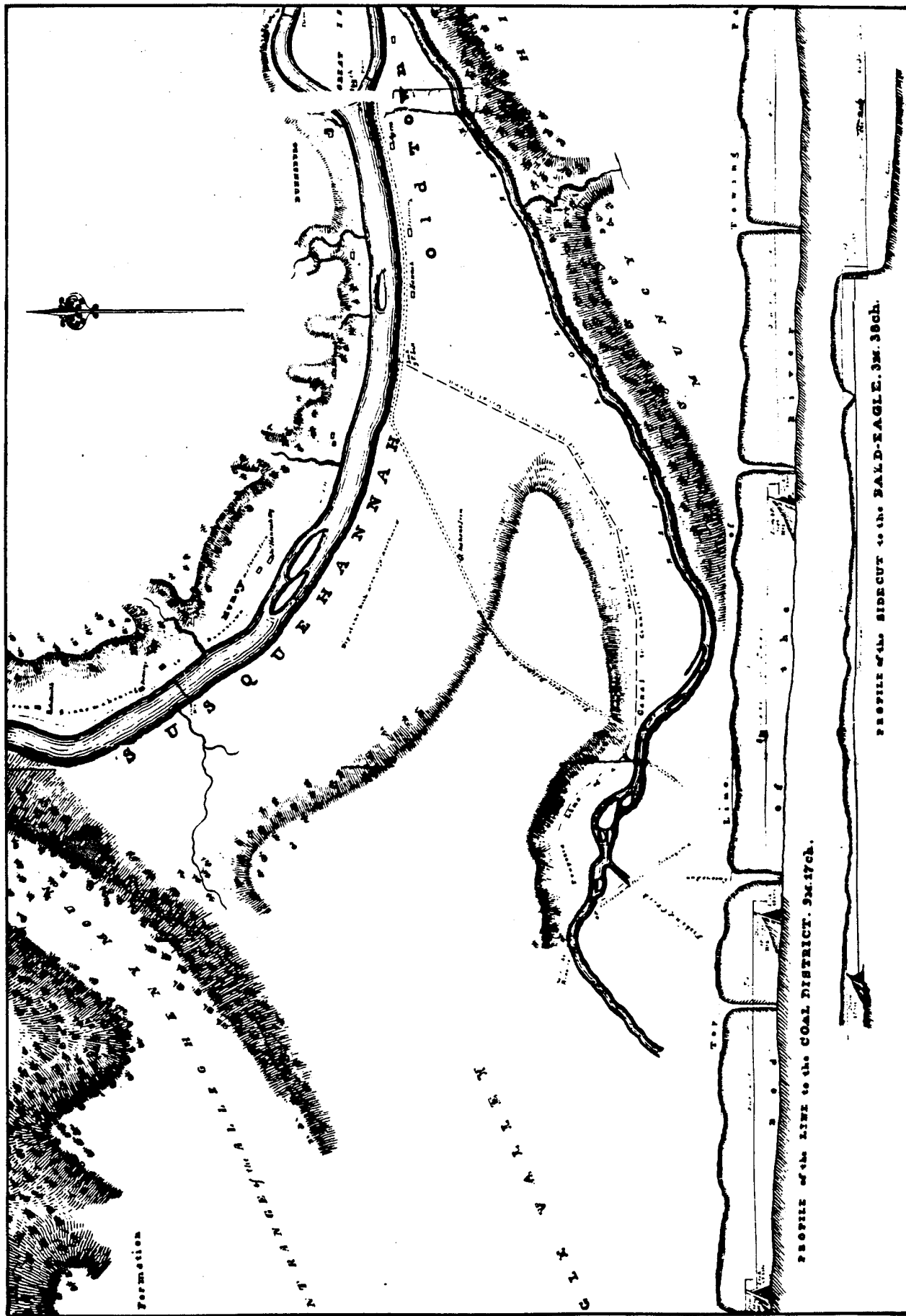
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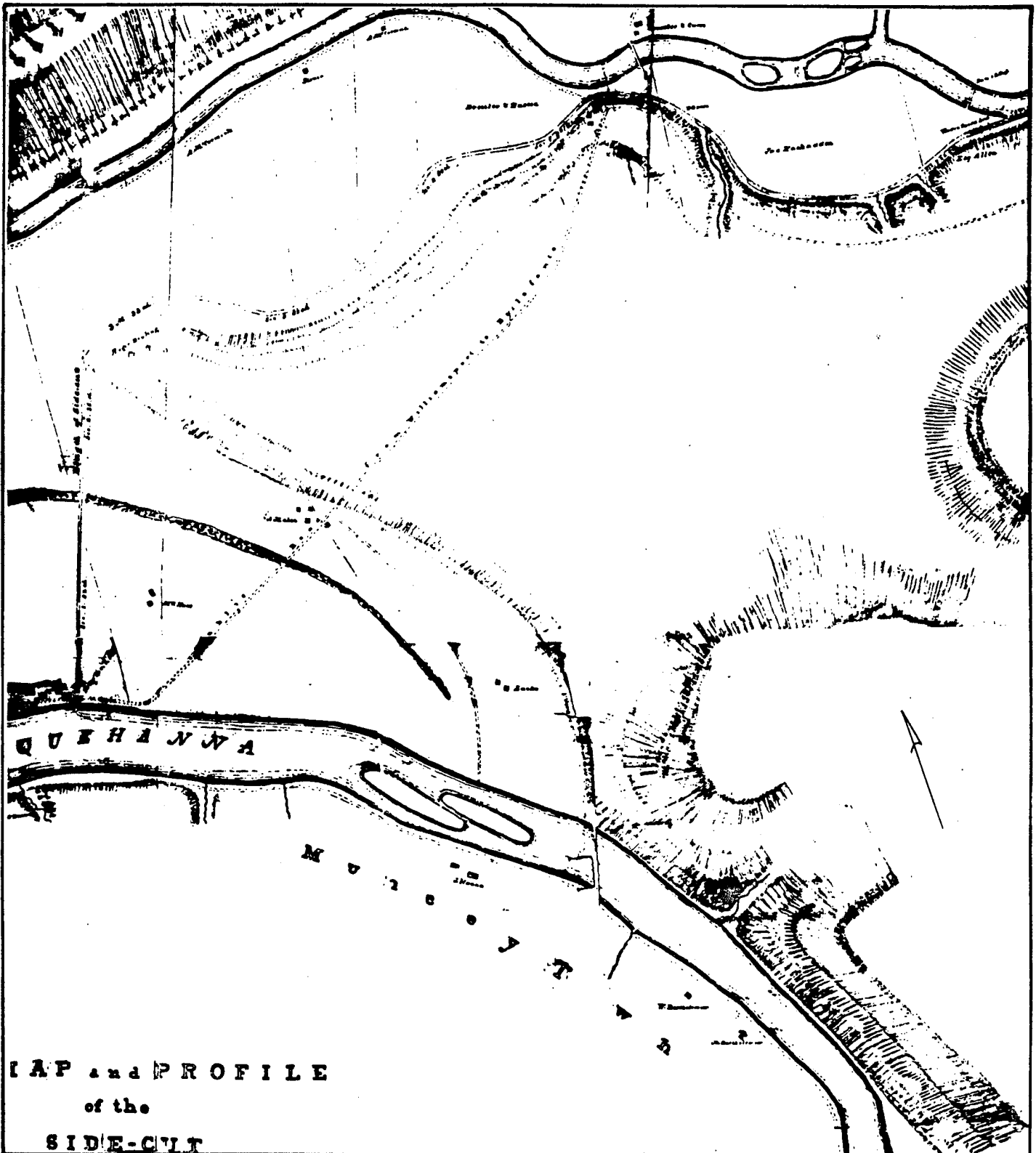
MAP OF THE PENNSYLVANIA CANAL SYSTEM
(Shank 1881: Frontispiece)



MAP OF THE WEST BRANCH CANAL
(Shank 1965: 41)

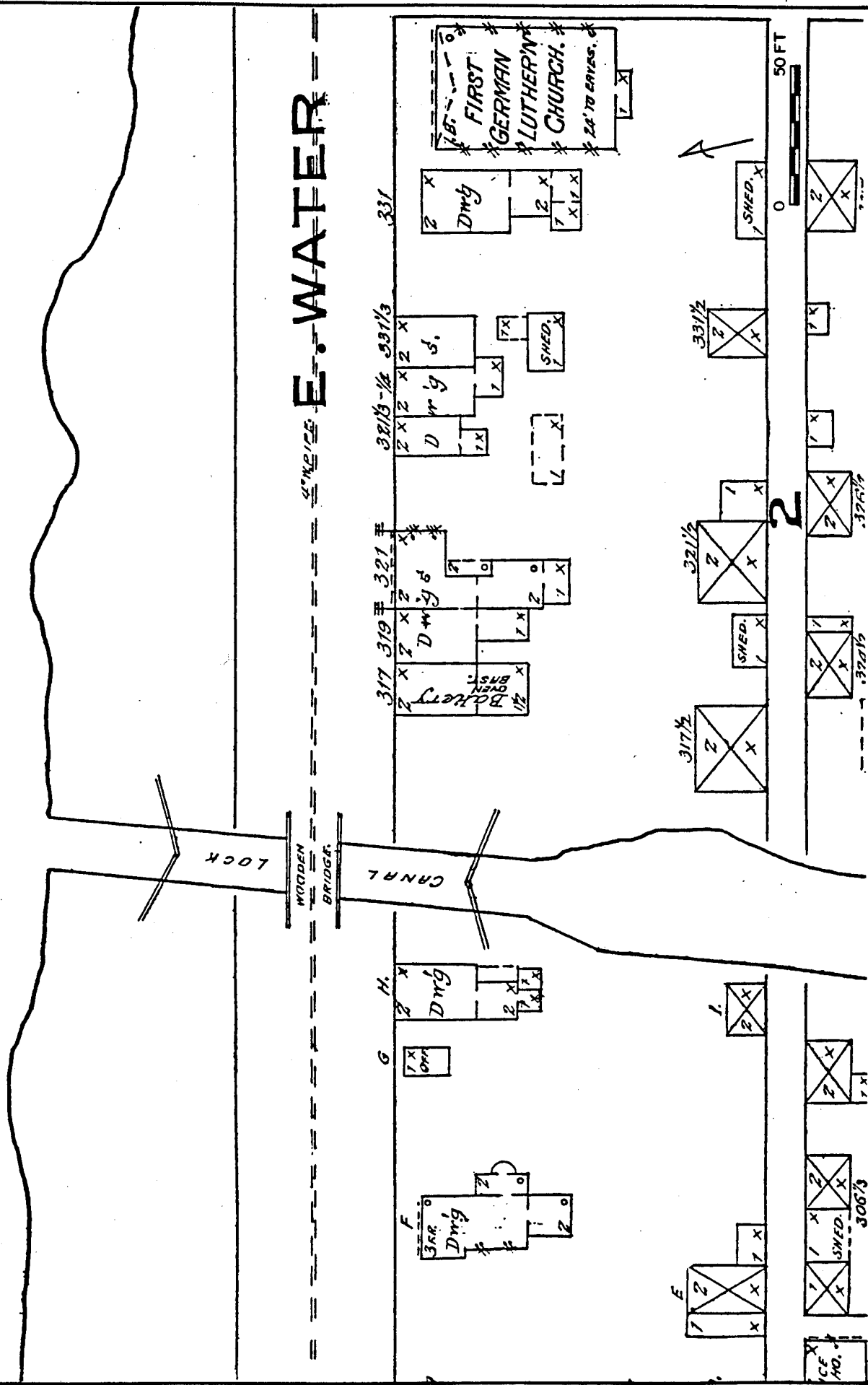


A MAP AND PROFILE OF A PLAN FOR TERMINATING THE WEST BRANCH CANAL



MAP AND PROFILE OF THE [BALD EAGLE] SIDE CUT

W. Branch of the Susquehanna



SANBORN MAP OF LOCK HAVEN IN 1885